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Original Articles

Intestinal Intubation in Bowel Obstruction

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SAN FRANCISCO

THE intelligent use of intestinal decompression by intubation and suction has been one of the most important factors in the reduction of the mortality rate associated with bowel obstruction.[1] Unless such treatment is used with understanding of its limitations, the mortality rate may actually be raised. Strangulating obstructions of the small bowel and any obstruction of the large bowel always demand immediate operation; any attempt to treat such conditions by suction is dangerous and must be vigorously condemned. However, a large group of simple mechanical obstructions of the small bowel and reflex or functional obstructions in which distention of the small bowel is the characteristic feature can be successfully treated by intubation decompression.

Much confusion of terminology exists in the surgical literature on obstruction, and this confusion has tended to cloud the exact indications for intubation decompression as a definitive treatment. It is my opinion that the term "small bowel distention" enables the surgeon to visualize more clearly the type of obstruction that may be especially suitable for intubation therapy. The term "small bowel distention," as used in this paper, is synonymous with the condition represented by the distended loops of small bowel seen on the flat film in cases of clinically suspected intestinal obstruction (Fig. 3*A*). It is always present in cases of simple obstruction and may or may not be present in cases of strangulation.

In the presence of small bowel distention due to conditions other than strangulating obstruction, intubation is definitely indicated as the first treatment and is often the only treatment necessary. If

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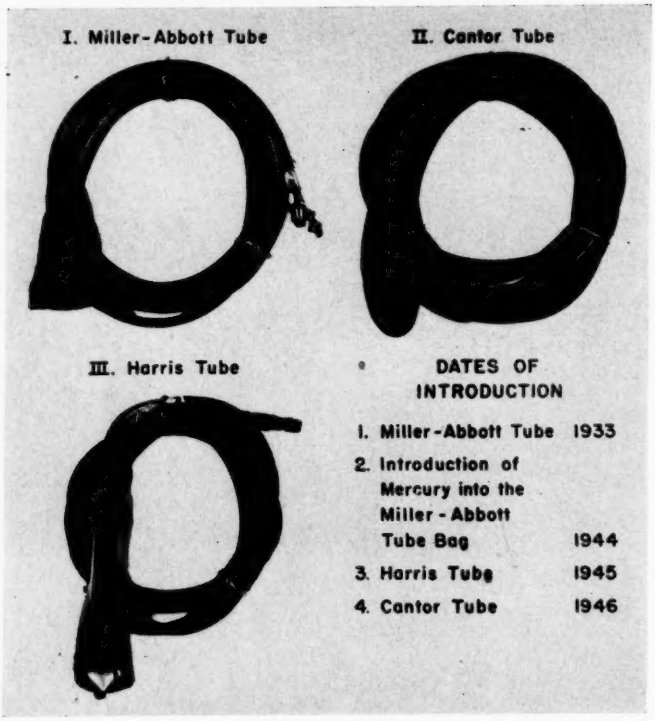
I. Miller-Abbott Tube
II. Cantor Tube
III. Harris Tube
DATES OF INTRODUCTION
1. Miller-Abbott Tube 1933
2. Introduction of Mercury into the Miller-Abbott Tube Bag 1944
3. Harris Tube 1945
4. Cantor Tube 1946

Plate 1.—Long intestinal decompression tubes.

intubation does not relieve distention completely within a reasonable time, surgical treatment must be considered.

The more common indications for intubation as a definitive treatment of certain forms of obstruction in which small bowel distention is a prominent factor are listed in Table 1.

Technic of Intubation.—There are commercially available today three long intestinal tubes that are used throughout the world in this technic: (1) the double lumen Miller-Abbott tube introduced in 1933,[2] (2) the Harris tube introduced in 1944,[3] and (3) the Cantor tube introduced in 1945.[4] Each of the last two has a single lumen, and it is my opinion that the single-lumen tube has many advantages over the slightly more complicated double-lumen tube.

Although caliber of the single-lumen tube is the same as that of the double-lumen type, its entire lumen is devoted to suction. The nursing care of such a tube is simplified, and in the Harris tube the use of metal sleeves allows suction to be applied both at the end and on the sides of the tube, in addition to insuring patency of the tube. Contrary to the opinion of Devine,[5] who claimed that the suction creates a vacuum that causes the intestine to collapse around the tube, the metal sleeves of the Harris tube eliminate this complication. I have had no experience with the new double-lumen tube advocated by Devine, but it appears from the description that the objections originally directed against the double-lumen Miller-Abbott tube would likewise apply to this new tube.

There are no openings higher in the Harris tube as compared to the Cantor modification of which Arthur Allen, reporting from Massachusetts General Hos-

TABLE 1.—*Indications for Intubation as Definitive Treatment for Distention of the Small Bowel*

A. Peritonitis, preoperative or postoperative
B. Postoperative adhesions, immediate and remote
C. Reflex distention (reflex ileus)
   a. Postoperative
   b. Traumatic
   c. Inflammatory without peritonitis
   d. Due to extra-intestinal painful stimuli
   e. Due to retroperitoneal pathologic change
   f. Due to medical conditions

TABLE 2.—*Analysis of Complications in 100 Intubations of 86 Patients*

Failure to pass tube through pylorus	10
Tube passed through rectum or colostomy	7
Escape of mercury from bag	4
Enterostomy required for removal	1
Peritonitis in attempted withdrawal of tube	1
Coiling of tube in stomach	3
Osmotic swelling of bag	3
No complications	71
Total	100

pital,[6] stated: "The high openings in the tube are designed to pick up secretions from the stomach as well as from the intestine. It appears that the benefit of the principle of the decompression tube may be lost by this method, since the normal secretions above the obstructed loop contain valuable chemical elements that are absorbable if not removed." Plate 1 shows these three tubes.

The technic of actual passage of the Harris tube or any of the long intestinal tubes is well illustrated by the illustrations in Plate 2. The use of liquid metallic mercury in the bag on the head of any of these long intestinal tubes, first described by myself as an aid in facilitating rapid intubation,[3a] is always advised. The routine orders for the nursing personnel aid considerably in the success with which intubation is accomplished; these are shown also on Plate 2. The possibility of gaseous distention of the latex bag attached to the head of the tube must always be considered, and an important step in its prevention is the flushing of the bag with carbon dioxide as first described by Lewis and Leff.[7]

ILLUSTRATIVE CASES

CASE 1.—S. G., a woman aged 42, entered the hospital on March 3, 1946, complaining of abdominal pains for the preceding twenty-four hours, accompanied with distention, nausea and vomiting. Cholecystectomy and hysterectomy had been performed one year earlier. Fig. 1*A*, taken on the date of admission, shows distention of multiple loops of small bowel. A Harris tube was passed immediately. Nine hours after its introduction the head of the tube had progressed rapidly to the obstructed small bowel, but a recheck film showed additional loops of distended small bowel despite successful intubation (Fig. 1*B*). Clinically, the patient appeared worse. Abdominal pain was increasing, and it was therefore decided that operation was indicated. Operation revealed mechanical obstruction of the small bowel due to an exudate encircling the lower part of the jejunum and originating from perforating acute mesenteric adenitis. Lysis of the obstructive adhesions was performed, and the immediate postoperative course was satisfactory. Three days after the operation, roentgen examination showed no small bowel distention, and, as the patient was comfortable and objected strenuously to the tube, it was removed before the usual therapeutic test of discontinuing suction for twelve hours was instituted. Symptoms immediately recurred, and a roentgenogram taken on March 8 (Fig. 2*B*) showed recurrent obstruction, as evidenced by a considerable number of loops of distended small bowel. Subsequent intubation was successful, and after nine days the final film (Fig. 2*C*) showed no evidence of small bowel distention. The tube was withdrawn. The patient's recovery was uneventful.

TABLE 3.—*Contraindications to Continuation of Intubation Therapy*

1. Appearance of dark, bloody drainage material in tube (an absolute indication of vascular strangulation)
2. Increase in distention of small bowel as shown by flat films
3. No clinical improvement after 24 hours of successful intubation
4. Increase in
   a. Pulse rate
   b. Fever
   c. Abdominal pain
   d. Leukocyte count
5. Abdominal mass not previously noted

TABLE 4.—*Absolute Contraindications to Intubation Therapy*

1. Strangulating obstructions (e.g., strangulating hernia)
2. Vascular obstructions (e.g., mesenteric thrombosis)
3. Obstructions of the large bowel (e.g., neoplasm of descending portion of colon)

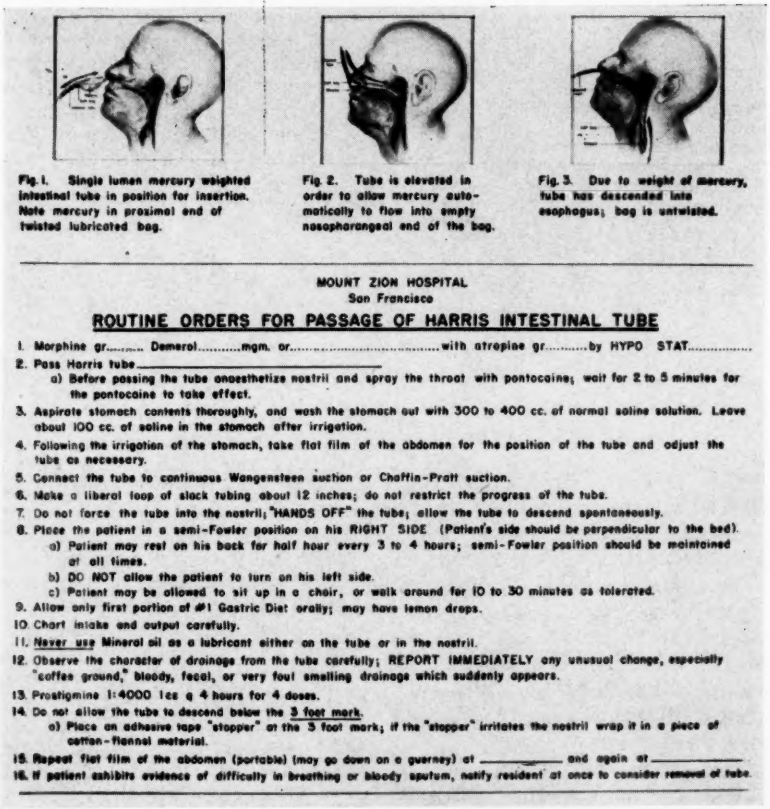

Fig. 1. Single lumen mercury weighted intestinal tube in position for insertion. Note mercury in proximal end of twisted lubricated bag.

Fig. 2. Tube is elevated in order to allow mercury automatically to flow into empty nasopharangeal end of the bag.

Fig. 3. Due to weight of mercury, tube has descended into esophagus; bag is untwisted.

MOUNT ZION HOSPITAL
San Francisco

ROUTINE ORDERS FOR PASSAGE OF HARRIS INTESTINAL TUBE

1. Morphine gr..... Demerol.....mgm. or.....with atropine gr.....by HYPO STAT.....
2. Pass Harris tube_____
   a) Before passing the tube anaesthetize nostril and spray the throat with pontocaine; wait for 2 to 5 minutes for the pontocaine to take effect.
3. Aspirate stomach contents thoroughly, and wash the stomach out with 300 to 400 cc. of normal saline solution. Leave about 100 cc. of saline in the stomach after irrigation.
4. Following the irrigation of the stomach, take flat film of the abdomen for the position of the tube and adjust the tube as necessary.
5. Connect the tube to continuous Wangensteen suction or Chaffin-Pratt suction.
6. Make a liberal loop of slack tubing about 12 inches; do not restrict the progress of the tube.
7. Do not force the tube into the nostril; "HANDS OFF" the tube; allow the tube to descend spontaneously.
8. Place the patient in a semi-Fowler position on his RIGHT SIDE (Patient's side should be perpendicular to the bed).
   a) Patient may rest on his back for half hour every 3 to 4 hours; semi-Fowler position should be maintained at all times.
   b) DO NOT allow the patient to turn on his left side.
   c) Patient may be allowed to sit up in a chair, or walk around for 10 to 30 minutes as tolerated.
9. Allow only first portion of #1 Gastric Diet orally; may have lemon drops.
10. Chart intake and output carefully.
11. Never use Mineral oil as a lubricant either on the tube or in the nostril.
12. Observe the character of drainage from the tube carefully; REPORT IMMEDIATELY any unusual change, especially "coffee ground," bloody, fecal, or very foul smelling drainage which suddenly appears.
13. Prostigmine 1:4000 1cc q 4 hours for 4 doses.
14. Do not allow the tube to descend below the 3 foot mark.
   a) Place an adhesive tape "stopper" at the 3 foot mark; if the "stopper" irritates the nostril wrap it in a piece of cotton-flannel material.
15. Repeat flat film of the abdomen (portable) (may go down on a gurney) at _____ and again at _____
16. If patient exhibits evidence of difficulty in breathing or bloody sputum, notify resident at once to consider removal of tube.

Plate 2.—Technic of intubation.

This case illustrates continued increase in small bowel distention and abdominal pain despite good suction intubation. Surgical intervention was therefore indicated and was performed because of fear of early strangulating obstruction. Inflammatory exudate from a perforated mesenteric gland, part of generalized mesenteric adenitis, was the cause of obstruction. The postoperative course was complicated by recurrence of small bowel distention, which was successfully treated by intubation alone.

CASE 2 *(Successful Treatment by Intubation)*.—D. S., a man 52 years old, was subjected to operation on May 6, 1950. Anterior resection and end-to-end anastomosis were performed for rectosigmoid carcinoma with lysis of multiple adhesions from an old perforation of the appendix twenty years earlier. The immediate postoperative course was uneventful; there was no vomiting and no distention. On the ninth postoperative day the patient complained that he had lost his appetite and could not swallow food. His abdomen was slightly distended. A flat film of the abdomen was made (Fig. 3*A*) and distended loops of small bowel, indicative of mechanical obstruction, were observed. Treatment by intubation was instituted, with complete and permanent relief (Fig. 3, *B, C and D.*).

This case illustrates postoperative small bowel distention due to operative adhesions resulting either from the lysis of the old adhesions or from the intestinal resection. The symptoms on the ninth postoperative day were minimal, and if my

associates and I had not learned that scout flat films should be taken postoperatively on the slightest suspicion, relief of this simple adhesion obstruction would have been delayed. Early intubation brought about rapid and complete relief of what was apparently a simple postoperative obstruction. This is the type of simple obstruction in which intestinal intubation has proved successful as definitive treatment in 80 to 90 per cent of cases. The spectacular results obtained with intubation in the treatment of postoperative adhesive obstructions has justified our enthusiasm for this method of treatment. Figures 4 and 5, with their legends, are illustrative of further experiences with intubation.

Complications Associated with Technic of Intubation (Table 2).—Failure of passage of the tube through the pylorus may be due to atony of the stomach associated with extreme weakness on the part of the patient, or it may be due to the inability to prop up the patient sufficiently or to allow him to stand up and walk a few steps. Occasionally it is attributable to an uncooperative patient who pulls out the tube. However, in such cases, the tube will serve to decompress the stomach and often, indirectly, the small bowel. Coiling of the tube in the stomach is another reason for failure and is usually due to an attempt to push the tube down into the obstructed bowel too rapidly. With the proper technic, the tube descends by its own weight once it is in the stomach. Breakage of the bag with spillage of mercury into the gastrointestinal tract is of no serious significance and will not produce mercury poisoning or any toxic effect on the patient. The mercury usually takes from three to ten days to pass out of the intestines.

Difficulty in withdrawal of the tube may be associated with osmotic distention of

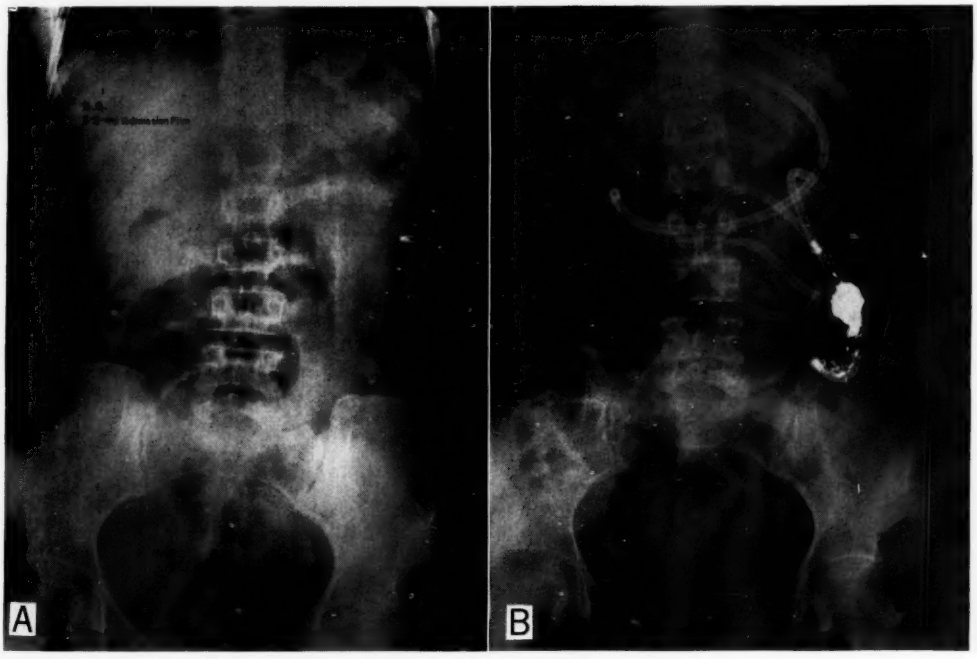

Fig. 1 (*Case* 1).—*A*, small bowel distention due to clinical obstruction. *B*, successful intubation after nine hours; there is, however, increased radiologic and clinical evidence of progressive small bowel obstruction; operation indicated.

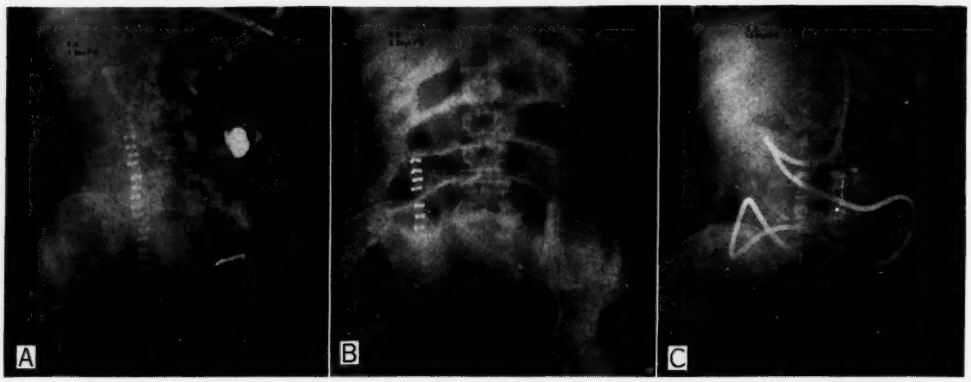

Fig. 2.—*A*, condition on first postoperative day, still showing few loops of distended small bowel, but obstruction is relieved as shown by gas in large bowel. *B*, film taken on fifth postoperative day. Harris tube had been withdrawn on third postoperative day at patient's insistence. This film shows recurrence of small bowel distention, and there is clinical evidence of recurrent obstruction. *C*, film showing position of tube. After reintroduction, it remained in the bowel until the thirteenth postoperative day, when roentgen and clinical evidence of obstruction had completely disappeared.

the bag, the prevention of which has been described elsewhere.[8] It is strongly urged that if a tube cannot be withdrawn by mouth or refuses to pass *per rectum, an exploratory laparotomy and enterostomy should be performed.* I have received personal reports of occasional deaths resulting from necrosis of the small bowel and peritonitis when the bag of an intestinal tube has been distended and caught. I have personally removed one such tube by enterostomy without ill effect, and the danger of such a procedure is much less than that of allowing the tube to remain in the intestine.

Duration of Intubation.—No absolute rule can be made concerning the length of time for which intubation should be maintained. In our series the shortest duration was twenty-four hours, followed by immediate relief in the case of a reflex small bowel distention associated with a cord tumor. The longest was seventeen days, in a case of postoperative small bowel obstruction due to adhesive bands. Frequent flat films of the abdomen must be taken, and the duration of intubation will be determined by roentgenologic as well as clinical improvement.

The tube is never withdrawn until the patient has been given a fair trial without suction. If abdominal distention does not recur after periods varying from six to twelve hours free from suction, it is a good indication that the tube should be removed.

Contraindications to Intubation.—Clinical contraindications to continuing intubation therapy are summarized in Table 3.[9] Absolute contraindications for intubation as definitive therapy will be noted in Table 4. Conditions diagnosed as strangulating obstruction, vascular obstruction, or obstruction of the large bowel require immediate surgical treatment, and intubation should not be considered as a form of definitive treatment. If a patient with one of these conditions requires preoperative hydration and other preoperative preparation which may take eight to twelve hours, it is worth while to pass a long intestinal tube, which will be useful in the postoperative period and may be of some value during the operation itself in minimizing the accompanying small bowel distention.

SUMMARY

Intestinal intubation properly used will reduce the general mortality rate of intestinal obstruction. In selected cases, par-

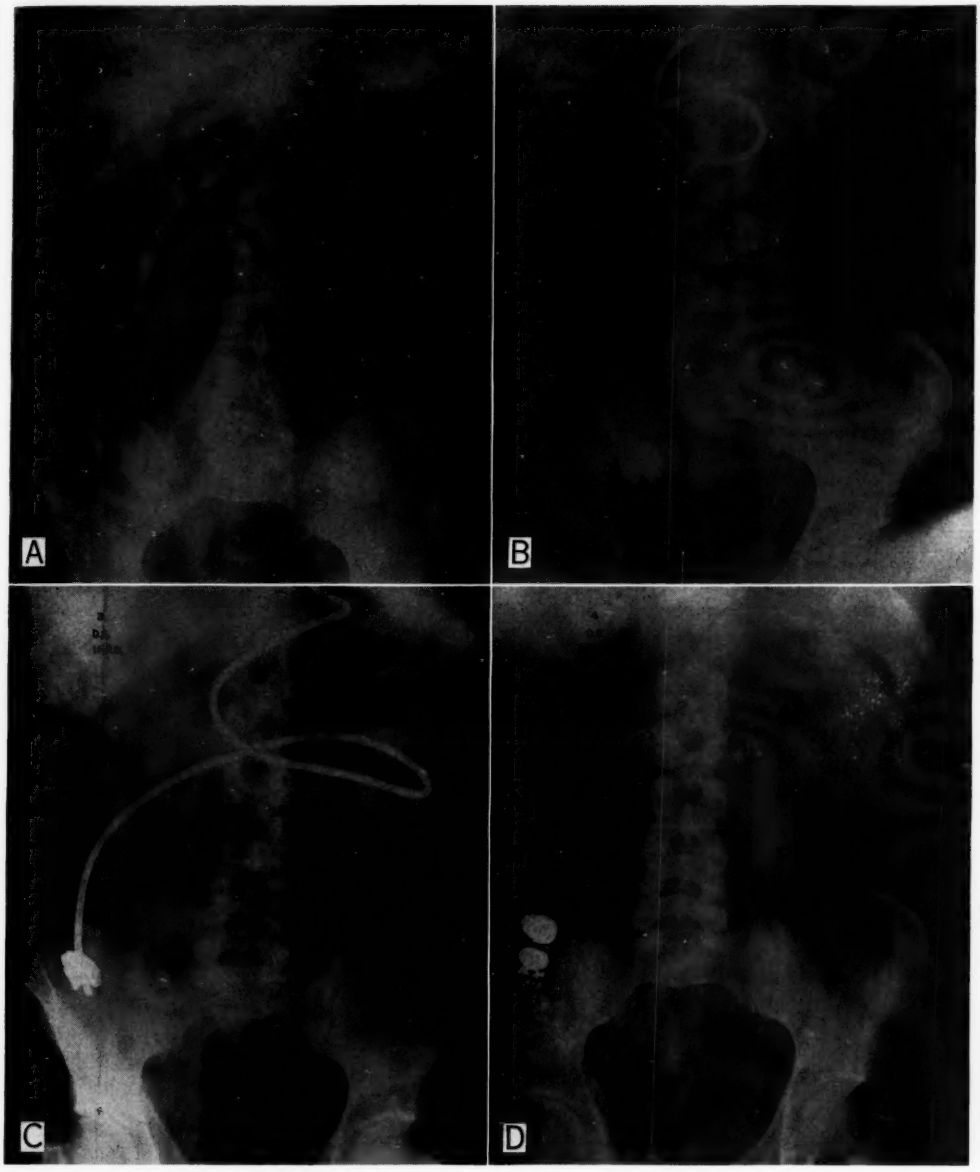

Fig. 3 (*Case* 2).—*A*, Roentgenograms taken on ninth postoperative day, May 15, 1951, shows small bowel distention due to mechanical obstruction. *B*, film taken twelve hours later. The Harris tube is in right lower quadrant. A few small loops of bowel in the upper part of the abdomen still persist, but improvement since the previous examination is marked. *C*, roentgenogram taken on May 17, 1951, forty-eight hours after *B;* small bowel completely deflated, gas in colon, patient clinically well. *D*, roentgenogram taken May 22, 1951. Tube has been removed. Mercury is scattered throughout the colon because the bag was broken, but this has no clinical significance. There is no small bowel obstruction.

ticularly in the presence of postoperative adhesive obstruction, definitive successful results may be obtained in 80 to 90 per cent of cases.

The term "small bowel distention" is advocated as that which best describes the type of case in which intubation therapy is indicated.

The three most common long intestinal tubes in use today are the Miller-Abbott, the Harris and the Cantor tube, all of which have certain advantages and disadvantages. A technic of intubation is described, with the use of mercury to facilitate rapid passage of such tubes.

Complications of intestinal intubation are comparatively minor, and methods for prevention and treatment of such complications are described. Four case histories of patients treated by intubation are presented to illustrate the various aspects of intubation technic.

There is danger of persisting in intubation therapy when surgical intervention should be employed, and contraindications to continuing such therapy are emphasized.

The absolute contraindications to the use of the long intestinal tube, except as ancillary therapy, are strangulating obstruction of the small bowel and any obstruction of the large bowel.

RESUMEN

La entubación intestinal usada adecuadamente reducirá el índice de mortalidad general de la obstrucción intestinal. En casos seleccionados, particularmente en presencia de obstrucción adhesiva postoperatoria, pueden obtenerse resultados satisfactorios definitivos en el 80 a 90% de los casos.

El término "distención del intestino delgado" es defendido como el que mejor describe el tipo de caso en el que la entubación está indicada.

Las tres sondas intestinales más largas actualmente en uso son la de Miller-Abbott, la de Harris y la de Cantor, teniendo todas ventajas y desventajas. A este respecto, se describe una técnica de entubación, utilizando mercurio para facilitar el paso rápido de dichas sondas.

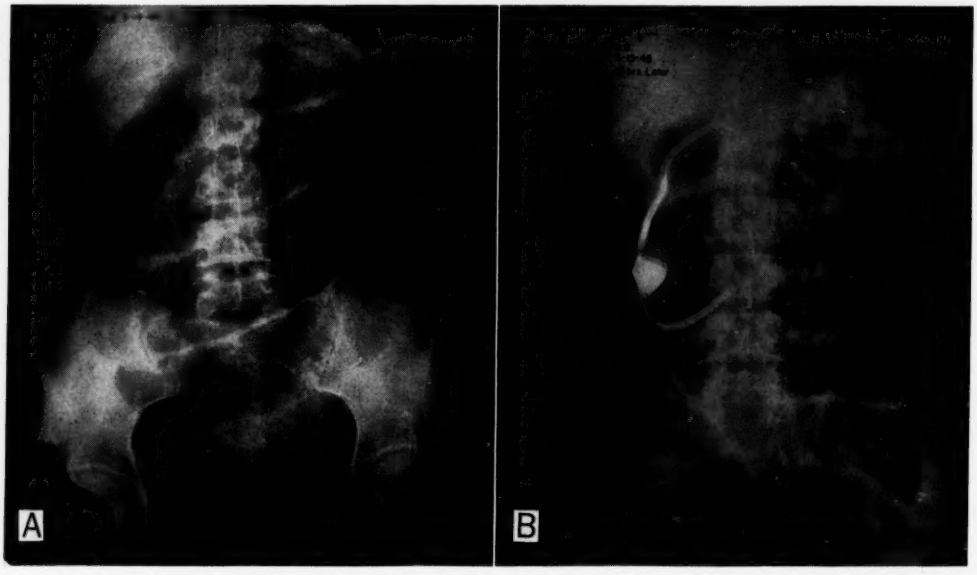

Fig. 4 (*Case* 3).—*A*, mechanical small bowel obstruction in 60-year-old woman, due to adhesions from hysterectomy performed at the age of 40. *B*, film taken eighteen hours later, showing only partial deflation by Harris tube. Operation indicated.

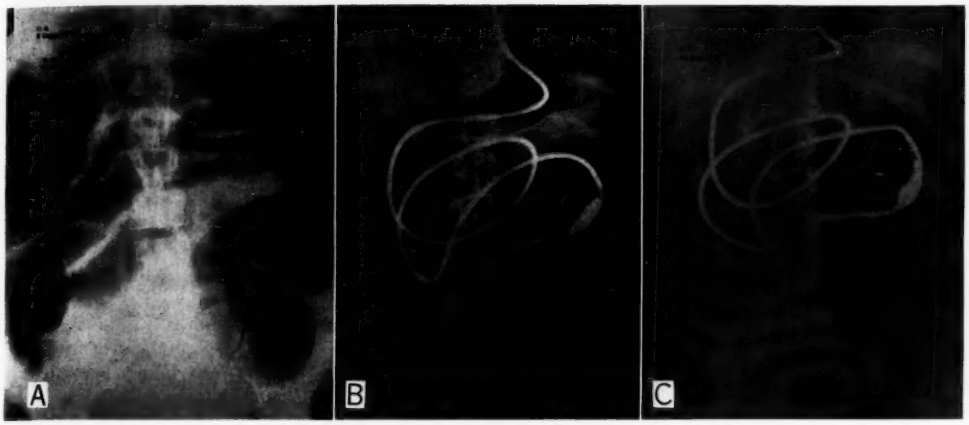

Fig. 5 (*Case* 4).—*A*, small bowel mechanical obstruction eight days after cesarean section and sterilization. *B*, films taken five days after intubation. Gas is seen in the large bowel and only an occasional loop of distended small bowel is visible. *C*, complete relief of obstruction, clinically and radiologically, eight days after intubation was started. No operation.

Se describen los métodos para prevención y tratamiento de la complicaciones de la entubación intestinal, complicaciones que son comparaticamente menores. Se presentan cuatro historias de pacientes tratados por entubación, para illustrar los varios aspectos de la técnica de entubación.

Se señala el peligro de persistir en la terapéutica por entubación cuando debe emplearse la intervención quirúrgica, así como las contraindicaciones para continuar dicha terapéutica.

Las contraindicaciones absolutas para el uso de la larga sonda intestinal, excepto la terapéutica auxiliar, son la obstrucción por estrangulación del intestino delgado y cualquiera obstrucción del intestino grueso.

RÉSUMÉ

Le tube intestinal proprement appliqué peut réduire considérablement le nombre d'opération. Dans les cas choisis, particulièrement dans la présence d'obstruction post-opératoire, le tube a donné de brillants résultats dans 80 à 90% des cas.

On emploie le terme "distension du petit intestin" pour décrire les cas types où le tube intestinal est inliqué.

On se sert aujourd'hui de trois tubes, dont les plus connus, sont le Miller-Abbott, le Harris et le Cantor, qui ont tous, à tour de rôle, des avantages et des désavantages. L'auteur décrit la méthode avec mercure pour faciliter le passage plus rapide de ces tubes.

Complications faciles à dépister, traitements des complications.

L'auteur présente l'histoire de 4 cas traités au moyen du tube.

L'auteur nous présente le danger de l'emploi répété du tube alors que l'opération est indiquée. La contr'indication absolue est dans le gros intestin, excepté dans l'étranglement du petit intestin ou dans l'obstruction du gros intestin.

RIASSUNTO

L'intubazione intestinale, correttamente usata, può ridurre la quota di mortalità nelle occlusioni intestinali. In casi selezionati, specialmente in presenza di occlusione da briglie post-operatorie, è possibile ottenere successi completi nell'80-90% dei casi.

Viene proposto il termine di "distensione del tenue" come quello che meglio descrive l'affezione in cui è indicato ap-

plicare la intubazione intestinale.

I 3 tubi più comunemente usati oggi sono quello di Miller-Abbot quello di Harris e quello di Cantor, e ognuno di esse presenta vantaggi e svantaggi.

Viene descritta una tecnica che si vale dell'uso del mercurio per facilitare il rapido passaggio di tali tubi.

Le complicanze dell'int bazione intestinale sono relativamente scarse; vengono descritti metodi per la prevenzione e la cura di esse. Vengono presentati 4 casi di pazienti in cui si fece la intubazione, per illustrare i vari aspetti della tecnica.

Esiste il rischio di insistere nella terapia di intubazione quando si dovrebbe attuare la terapia chirurgica; vengono messe in luce le controindicazioni della terapia protratta.

Le controindicazioni assolute all'uso del tubo intestinale, tranne che come terapia sussidiaria, sono rappresentate dallo strozzamento del tenue e dalle occlusioni del colon.

ZUSAMMENFASSUNG

Die sachgemaesse Einfuehrung von Darmsonden traegt zur Herabsetzung der allgemeinen Sterblichkeit in Faellen von Darmverschluss bei. In ausgewaehlten Faellen, besonders bei postoperativen Verwachsungen, koennen unbestreitbare Erfolge in 80 bis 90% erzielt werden.

Die Anwendung des Ausdrucks "Duenndarmerweiterung" wird empfohlen, um am besten die Art der Faelle, in denen Sondenbehandlung angezeigt ist, zu beschreiben.

Die drei heute am meisten benuetzten langen Darmsonden sind die Miller-Abottsonde, die Harrissonde und die Cantorsonde. Alle drei haben gewisse Vorzuege und Nachteile. Es wird eine Technik der Sondeneinfuehrung beschrieben, die sich fur Beschleunigung der Passage des Quecksilbers bedient.

Komplikationen der Sondeneinfuehrung sind verhaeltnismaessig geringfuegig. Es werden Methoden zur Verhuetung und Behandlung solcher Komplikationen beschrieben. Zur Erlaeuterung der verschiedenen Aspekte der Intubationstechnik werden die Krankheitsgeschichten von vier mit Sondeneinfuehrung behandelten Patienten berichtet.

Es besteht die Gefahr, eine Sondenbehandlung fortzusetzen, wo ein chirurgischer Eingriff angezeigt ist. Die Kontraindikationen der Fortsetzung der Intubationsbehandlungen werden unterstrichen.

Die absoluten Kontraindikationen der Anwendung der langen Darmsonde sind, ausser wenn es sich um eine unterstuetzende Therapie handelt, die Abklemmungsverschluesse des Duenndarms und alle Dickdarmverschluesse.

SUMARIO

A intubação intestinal adequademente usada reduz a taxa geral de mortalidade da obstrução intestinal. Em casos selecionados, particularmente na presença de obstrução adhesiva posoperatoria bons resultados definitivos podem ser obtidos em 80 a 90 por cento de casos.

O termo "distensão do intestino delgado" é proposto como o que melhor descreve o tipo de caso em que a terapeutica de intubação é indicada.

O tres tubos longos intestinais em uso atualmente são o de Miller-Abbott, o de Harris e o Cantor, os quais possuem vantagens e desvantagens. A tecnica de intubaçao é descrita, usando-se o mercurio para facilitar a rapida passagem de tais tubos. As complicaçoes da intubação intestinal são comparativamente raras e os metodos para prevenção e tratamento de tais complicaçõessão descritas. Quatro histroias de casos tratados com intubação são apresentados para ilustrar os varios aspetos da tecnica da intubação. Ha o perigo de se persistir na terapeutica da intubação quando a intervenção cirurgica esteja indicada e as contra-indicações para a continiação de tal terapeutica são realçadas.

As absolutas contra-indicações ao uso do longo tubo intestinal, excepto como terapeutica auxiliar são a obstrução do intestino delgado por estrangulação e qualquer obstrução do grosso intestino.

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Giant Cell Tumors of Bone

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OVER the years, extensive cooperation among surgeons, roentgenologists and pathologists has brought about improved diagnosis, improved prognosis and much better results in the treatment of giant cell tumors of bone. Early recognition of these tumors, before they have caused extensive destruction, with perforation of the cortex of the bone and involvement of joints and soft tissues, is essential to successful treatment. The family physician, who is usually the first to examine and discover these tumors, has the responsibility of calling for immediate consultation. This is a disease in which a policy of watchful waiting is to be condemned and early treatment is to be advocated. Furthermore, although the administration of roentgen rays is now frequently employed with safety by experienced roentgenologists, and in some instances may be the only treatment applicable, in my opinion the modern surgical technic of excision and bone grafting is the treatment of choice.

Terminology and Classification. — The term "giant cell tumor" is used in a general sense. It includes both benign and malignant tumors, but its indiscriminate use has led to confusion. Such terms as "central," "ephiphysial," "metaphysial" and the like may serve to locate the area of bone involved but are of doubtful diagnostic value. I use the following classification:

Giant Cell Tumors of Bone

1. Benign giant cell tumor
2. Malignant giant cell sarcoma
   (a) Primary
   (b) Secondary

When the pathologist has subjected a specimen of tissue from the tumor to microscopic examination and is unable to find histologic evidence of malignant change, a diagnosis of benign giant cell tumor is made.

Should the excised specimen of tissue, at the time of the first operation, show microscopic evidence of malignant cellular structure, the tumor is classified as primary malignant giant cell sarcoma.

All surgeons are familiar with instances in which repeated treatments have been given for lesions diagnosed microscopically as benign giant cell tumors that subsequently proved malignant. To such lesions I apply the term secondary malignant giant cell sarcoma.

This simple classification, readily understood by all workers in the medical, surgical, roentgenologic and pathologic fields, should aid in clarifying the confusion that was so prevalent in the past.

Value of Diagnostic Aids. — Because giant cell tumors usually develop slowly and cause little pain in young adults, they may not be discovered until an aching pain, with slight thickening or bulging of bone, is noted, or until the roentgenogram shows a rounded area of osteolytic defect of the bone. Such a defect may involve the epiphyses or metaphyses or both, and may perforate the cortex, penetrating soft tissue or, more rarely, the joints themselves. Pathologic fracture may occur, especially if the disease is of long standing.

The average duration of symptoms before treatment was sought was nineteen months in a series of 105 benign giant cell tumors I studied by myself. When roentgenologic examination of painful areas of bone is made more frequently, diagnosis will be made earlier, before the tumor mass is visible or palpable. Often a history of trauma in the area of tumor for-

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mation is obtained. Such a history of injury or reported injuries usually is said by the patient to have preceded the development of symptoms. Actually, however, careful inquiry may disclose that the injury or injuries occurred after discovery of the lesion.

Value of Roentgenograms in Diagnosis: Roentgenologic examination of painful areas of bone is the greatest single aid to the early diagnosis of giant cell tumors. Roentgenograms enable the surgeon to determine the exact site and size of the tumor. Consequently, as a result of his long experience, he is able to determine the proper method of treatment and to attain a high degree of accuracy in diagnosis. Roentgenograms also provide the earliest evidence of pulmonary metastasis; the rounded, clear-cut areas of metastasis will show long before the history or the results of physical examination or laboratory procedures give clues as to their formation. In fact, the great possibilities provided by this method have led my associates and me to take routine roentgenograms of the thorax for evidence of pulmonary metastasis before operation. It has been my experience that a healthy-appearing patient, who has not lost weight and has not had a persistent cough, may be referred for surgical treatment, and yet, when routine roentgenologic examination of the thorax is carried out, may exhibit extensive metastatic pulmonary metastasis.

Cooperation of the Pathologist: Whenever possible, we have the pathologist attend the operation and make an immediate fresh frozen section of a specimen from the tumor. Examination of such a specimen usually takes only a few minutes, and the report may corroborate or disprove the preoperative diagnosis. Should there be doubt as to the interpretation of the fresh frozen microscopic sections, the pathologist is given further time in which to make fixed frozen sections and to study the tissue. His final opinion as to the benignancy or the degree of malignancy influences the surgeon's treatment, because it is an important factor in the determination of the surgical procedure to be used. Since primary malignant giant cell tumors cannot be diagnosed with certainty on the basis of clinical and roentgenologic observations alone, the surgeon regards the pathologist's observations as indispensable. The same is true in cases of secondary malignant giant cell sarcoma, which may be complicated by infection and drainage. I cannot emphasize too greatly the fact that the surgeon, the roentgenologist and the pathologist, working together intimately, all contribute to arrival at a correct diagnosis and method of treatment.

Factors in Selection and Evaluation of Treatment.—With the use of aseptic surgical technic, new methods of anesthesia, treatment with antibiotic agents and the control of hemorrhage and infection, as well as prevention of shock, more time has become available for the performance of extensive operations, and more radical procedures can be carried out safely. Formerly, hemorrhage and shock were serious complications, and operations for tumors of bone were often attended by death, even when the lesions were benign. In rare instances a tumor is so situated and of such great size as to contraindicate surgical treatment, in spite of improved methods for the control of serious complications. In such a case the administration of roentgen rays is considered the treatment of choice. I still have an open mind as to the value of roentgen ray treatment, although, as technical methods of administration improve, roentgen rays in time may prove to be of even greater value than I am willing at this time to admit.

At present it is my opinion that most benign giant cell tumors and those of a low degree of malignancy do not require preoperative or postoperative roentgen treatment when complete surgical removal is feasible. The reason for this belief is that there is always uncertainty as to the true diagnosis when only the clinical and roentgenologic data are relied upon. When early diagnosis is possible and is corroborated by the pathologist's examination of tissue removed at operation, more accurate data are provided as to the nature of the

lesion, which means that no time is lost and that, in some cases, metastasis can be prevented. The results of treatment based on clinical and roentgenologic diagnosis alone cannot, in my opinion, approach the same value as those based on clinical and roentgenologic diagnosis plus the gross and the microscopic pathologic observations.

To evaluate properly the benefits of any treatment, several factors must be considered. The accuracy of the diagnosis, the judgment displayed in selection of the method of treatment, the adequacy of the operation (which depends on the skill of the surgeon), and the results obtained from a thorough follow-up record of patients over a period of years are important. Errors in diagnosis may discredit the treatment originally considered proper; the subsequent course of the disease may prove the diagnosis to have been incorrect.

Resection of Tumor-bearing Bone and Replacement by Bone Grafts.—I have consistently advocated that the treatment of giant cell tumor be surgical. In certain cases of benign giant cell tumor, resection of the area of bone containing the tumor and replacement of the resulting bony defect with autogenous bone or preserved bone from bone banks not only relieves the patient permanently of the lesion but results in useful formation of the extremity. As a rule this operative procedure is restricted to tumors occurring in the fibula, humerus, radius and ulna. Results obtained by this method have been most gratifying (Fig. 1, *a*, *b*, *c* and *d*).

Thorough removal of a benign giant cell tumor by curettage and cauterization of the resulting cavity with phenol and alcohol or the actual cautery formerly were commonly employed, and with good results. To this method has now been added the filling of the cavity with autogenous or bone-bank bone. Cavities which at one time might have been slow in healing or in which hemorrhage and occasionally drainage with infection might have developed, now can be seen in roentgenograms to be rapidly healing and filling with bone. The bone is soon able to withstand the stress and strain of normal activity, and function is restored with reduced loss of time. When a tumor is large it is advisable at times to pack the cavity temporarily with a gauze pack to control bleeding, close the wound and do the bone grafting a few days later. Excision of the tumors and replacement of excised bone by grafting have given excellent results, far better than those obtained by removal by curettage followed by cauterization.

Malignant Giant Cell Sarcoma.—In a series of 130 giant cell tumors, 105, or 80+ per cent, were classified as benign giant cell tumors and 25, or 19+ per cent, as malignant giant cell sarcomas. Of the latter group 19, or 76 per cent, were classified as primary malignant sarcomas and 6, or 24 per cent, as secondary malignant sarcomas. The grading of the degree of malignancy was based on Broders' classification, which is founded on the principle of differentiation of cells. Hence, a Grade 1 lesion is of low, and a Grade 4 lesion is of high, malignancy. When malignancy is of low degree, as in a tumor of Grade 1, conservative surgical treatment often gives good results. When malignancy is high, as in tumors of Grades 3 and 4, I perform amputation whenever possible, but the most radical surgical procedure may not prevent metastasis. It is obvious that, so far as so-called cure is concerned, statistical evaluation of conservative surgical treatment versus amputation for malignant giant cell sarcomas should take into consideration the degree of malignancy of the lesion. It is common to employ roentgen treatment for malignant giant cell sarcomas in addition to surgical intervention.

REPORT OF CASES

CASE 1 *(Total Resection of Bone-bearing Benign Giant Cell Tumor and Insertion of Autogenous Fibular Graft).*—A woman 33 years old was seen on June 22, 1920, because of a tumor of the lower end of the right ulna. Ten years earlier she had been injured and had been treated for a fracture of the distal end of the right ulna, after which "a

Fig. 1 (Case 1).—Preoperative lateral roentgenogram (*a*) taken on June 22, 1920, of a benign giant cell tumor involving the epiphysis and metaphysis of the distal end of the right ulna; *b*, postoperative anteroposterior roentgenogram, taken on Sept. 20, about three months later, showing autogenous fibular graft inserted after resection of the distal half of the ulna; *c*, interoposterior roentgenogram taken on Jan. 17, 1921, about seven months after the view shown in Figure 1*a*, which depicts some absorption and apparent weakening of the graft in its midportion; union of the graft with the ulna is not calcified, but the distal end of the graft is shaping itself to a normal appearance of the ulna; *d*, roentgenogram taken on July 21, some thirteen months after the view seen in Figure 1*a*: the midportion of the graft shows fracture with subsequent callous formation, and the union is in good position. The graft has united firmly with the ulna. The distal end of the graft has shaped itself to a normal contour. *Reproduced, with permission of the publishers, from Meyerding, H. W.: Benign Foreign Body Giant Cell Tumors in the Long Bones.* J.A.M.A. *83*:1323-1328 (Oct. 25) 1924.

large mass formed and caused pain." She said that the tumor appeared to be enlarging.

The patient seemed to be in excellent health. The temperature, pulse and blood pressure were normal. A hard fixed tumor mass was visible just above the right wrist. The roentgenologic diagnosis was giant cell tumor of the lower end of the right ulna (Fig. 1*a*).

At operation on June 26, total excision of the lower part of the ulna was performed, and an autogenous fibular graft was inserted and sutured with chromic catgut. A plaster of paris cast was applied so as to immobilize the wrist and elbow. The stitches were removed and a new cast was applied. The patient returned to her home and did her housework. Roentgenograms were taken at intervals of three (Fig. 1*b*), seven (Fig. 1*c*) and thirteen (Fig. 1*d*) months after operation; these showed that the graft had remained in good position. Fracture occurred at the center of the graft between the seventh and thirteenth month (Fig. 1*c*), with callus formation and union. The graft united with the ulna and assumed a normal articular appearance at the distal end. In April 1926, approximately six years after the operation, the patient was well and function of the forearm was normal.

Comment on Case 1.—The diagnosis "giant cell tumor", which was employed at the time of operation thirty-two years ago, was made preoperatively; after microscopic examination the tumor was classi-

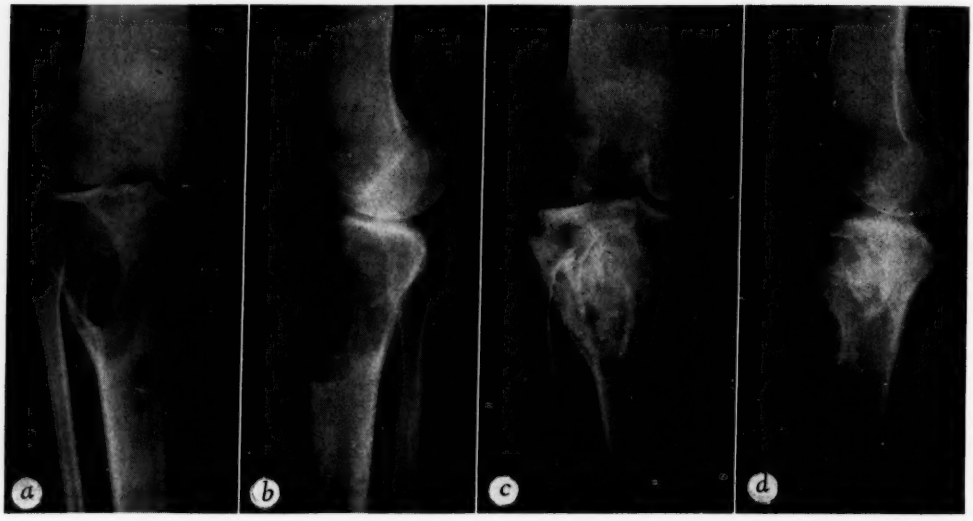

FIG. 2 (Case 2).—Preoperative anteroposterior roentgenogram (*a*) taken on Jan. 24, 1940, of a benign giant cell tumor of the epiphysis and metaphysis of the proximal part of the right tibia; *b*, lateral roentgenogram, taken on the same date as that in Figure 2*a*, showing absorption of the anterior portion of the tibial cortex, with the tumor bulging out into the soft tissues; *c*. anteroposterior roentgenogram taken on May 16, 1940, about four months after the operation, showing that the cavity, after excision of the tumor and packing with multiple autogenous bone grafts, has become completely ossified; *d*, lateral roentgenogram taken on May 16, 1940, about four months after the operation. *Reproduced, with permission of the publishers, from Meyerding, H. W.: Benign and Malignant Giant Cell Tumors of Bone,* J.A.M.A. *117*:1849-1854 (Nov. 29) 1941.

fied as benign giant cell tumor. It is interesting to see, in the roentgenograms, the bone absorption, fracture and callous formation at the middle position of the graft. The tumor involved the epiphysis and the metaphysis, and was benign.

CASE 2 *(Excision, Cauterization, Packing Wound and Secondary Insertion of Bone Grafts for Benign Giant-cell Tumor of Upper Part of Tibia).*—A housewife 27 years old complained of pain about the right knee, of three months' duration. She recalled falling on the knees six months prior to consultation. During the month prior to her admission in January 1940, she had slipped and sprained the knee on two occasions. During the course of examination results of repeated serologic tests were positive for syphilis. Antisyphilitic treatment was carried out and roentgenograms were made (Fig. 2, *a* and *b*). At operation a soft, mottled tumor was removed by curet, and the cavity was cauterized. Because of profuse hemorrhage the wound was packed with gauze and was sutured without drainage. Eleven days later, when the pack was removed, the wound was dry and clean. At this time bone chips from both ilia were packed into the cavity, and the wound was closed again without drainage. A cast was applied to immobilize the leg. Healing occurred by primary intention, and the patient had an uneventful convalescence (Fig. 2, *c* and *d*). At the time of this report she had had no recurrence and had good function of the leg.

Comment on Case 2.—I have rarely encountered a benign giant cell tumor complicated by syphilis. Packing and closure without drainage in cases in which serious hemorrhage occurs have been resorted to on several occasions, without untoward results. The roentgenograms show that the epiphysis and metaphysis are involved, with bulging of and thinning of the cortex, and extensions to the cartilage.

CASE 3 *(Malignant Giant Cell Sarcoma of the Femur With Pathologic Fracture: Microscopic Verification of the Diagnosis and Roentgen Treatment).*—A girl 10 years old,

admitted to the Mayo Clinic in October 1940, complained of pain in the left thigh, of a month's duration. Pathologic fracture had occurred (Fig. 3, *a* and *b*). Biopsy was performed, and a diagnosis of malignant giant cell sarcoma was made. The roentgenologist had diagnosed the lesion as an "osteogenic sarcoma." Roentgenograms of the thorax did not disclose pulmonary metastasis. Amputation was refused, and roentgen therapy was administered. Immobilization gave relief of the severe pain. Three months later the patient appeared to be greatly improved, and the fracture seemed to have united. Routine roentgenograms of the thorax, however, revealed pulmonary metastasis (Fig. 3*c*). The primary tumor enlarged and broke down (Fig. 3*d*). Death occurred seven months from the time of onset of the symptoms.

SUMMARY

The author presents some of his observations gained in the practice of orthopedic surgery for more than forty years in dealing with giant cell tumors. A classification that separate benign and malignant giant cell tumors is given. It is recognized that, after treatment, a benign giant cell tumor may become malignant. Stress is laid on the diagnostic value of roentgen rays in the early discovery of tumors and their metastatic processes. Surgical treatment is advocated, and total excision and bone-grafting operations are preferred for benign and low degrees of malignancy, but amputation should be performed for extremely malignant tumors when possible. Roentgen rays constitute one of the greatest aids to diagnosis, and irradiation eventually may prove to be the treatment of choice. Modern aseptic surgical technic, improved methods of anesthesia, the use of antibiotic agents, and newer means of controlling hemorrhage and preventing shock have contributed to the excellent results now obtainable.

SUMARIO

O autor apresenta algumas de suas observações ganhas na pratica da cirurgia ortopedica por mais de quarenta anos de tratar com tumores de celulas gigantes. E dada uma classificação que separa tu-

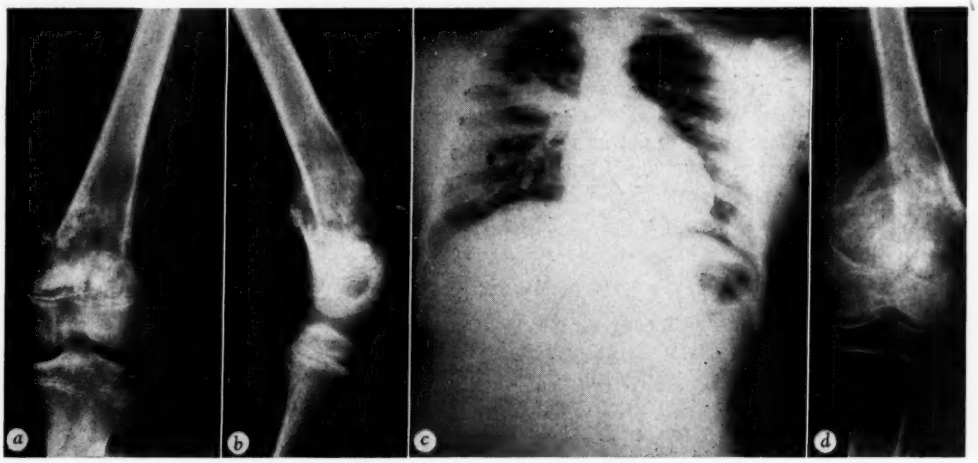

Fig. 3 (Case 3). Anteroposterior roentgenogram (*a*) taken on Oct. 10, 1940, of a malignant giant cell sarcoma of the lower end of the left femur (metaphysis), with pathologic fracture at the time of admission; *b*, lateral roentgenogram taken on the same date; *c*, roentgenogram of the thorax taken on Jan. 2, 1941, about three months after the onset of symptoms, showing metastasis to the lungs; *d*, roentgenogram of the area of the left knee taken on Jan. 2, 1941, three months after roentgenray therapy, showing marked calcification and apparent union of the pathologic fracture. (Reproduced, with permission from the publishers, from: Meyerding, H. W. and Broders, A. C.: Primary Malignant Giant Cell Sarcoma of Long Bones, Tr. West. S. A., 1941, pp. 76-92).

mores de celulas gigantes benignos e melignos. E reconhecido que, depois do tratamento, um tumor de celulas gigantes benigno pode se tornar maligno. Realça-se o valor diagnostico dos Raios na descoberta prococe dos tumores e dos sens processo metastaticos. O tratamento cirurgico é preconizado; exerése total e enxerto osseo são preferiveis os benignos e para os de pequeno grau de malignidade, mas a amputaçao deve ser executada os tumores extremamente malignos quando possivel. Os raios Roentgen cinstituem um dos maiores auxiliaries do diagnostico e a irradiação pode eventualmente ser demonstrada como o tratamento de escolha. Tecnicas cirurgicas asepticas modernas, processos de anestesia aperfeiçoados, o uso de agentes antibioticos e os mais modernos meios de controle de hemorragia e de prevenção de choque tem contribuido para os excelentes resultados agora possiveis de obter.

RÉSUMÉ

L'auteur présente ses observations personnelles de 40 années de pratique en orthopédie, intéressant surtout les tumeurs à cellules géantes. L'auteur parle de l'utilité de la radiographie comme moyen de diagnostic. Le traitement recommandé est l'extirpation avec greffe osseuse; quelquefois l'amputation est nécessaire. L'auteur recommande l'usage de la radiographie et des procédés modernes de chirurgie avec antibiotiques, contrôle de l'hémorragie, etc.

RIASSUNTO

L'Autore presenta alcune delle osservazioni personali raccolte nella pratica ortopedica di più di 40 anni, riguardanti i tumori a cellule giganti. Essi vengono classificati in benigni e maligni. E' noto che, dopo la cura, un tumore benigno può transformarsi in maligno. Viene sottolineata l'importanza dell'indagine radiologica per il riconoscimento precoce del tumore e delle sue metastasi. Viene caldeggiata la cura chirurgica, che nelle forme benigne o a basso grado di malignità, sarà di preferenza la escisione totale e il trapianto osseo, in quelle maligne la amputazione—quando possibile.

I raggi Roentgen rappresentano uno dei più validi ausili alla diagnosi e la irradiazione può anche rappresentare il trattamento di scelta. Le moderntechniche chirurgiche asettiche, i migliorati metodi di anestesia, l'uso degli antibiotici e i nuovi sistemi per il controllo dell'emorragia e la prevenzione dello shock hanno cotribuito al raggiungimento di risultati eccellenti.

RESUMEN

El autor presenta algunas de sus observaciones, de conformidad con su experiencia en cirugía ortopédica por más de cuarenta años en la atención de tumores de células gigantes. Se clasifican dichos tumores en benignos y malignos. Se reconoce que, después de tratamiento, un tumor de células gigantes benigno puede convertirse en maligno. Se insiste en el valor disgnóstico de los rayos röntgen para el descubrimiento temprano de los citados tumores y sus metástasis. Se recomienda el tratamiento quirúrgico, prefiriéndose la excisión total e injerto óseo en casos benignos y de bajo grado de malignidad, pero amputando cuando es posible en tratándose de tumores extremadamente malignos. Los rayos röntgen constituyen uno de los más grandes auxiliares para el diagnóstico, pudiendo la irradicación ser eventualmente el tratamiento de elección. La técnica quirúrgica aséptica moderna, los métodos mejorados de anestesia, el uso de antivióticos, así como los más recientes recursos para controlar la hemorragia y prevenir el choque, han contribuido a los excelentes resultados que se obtienen en la actualidad.

ZUSAMMENFASSUNG

Der Verfasser berichtet ueber einige Beobachtungen, die er in einer mehr als 40jaehrigen orthopaedisch - chirurgischen Praxis mit Riesenzellentumoren

gemacht hat. Er gibt eine Klassifizierung, welche die gutartigen von den boesartigen Riesenzellentumoren unterscheidet. Es wird zugegeben, dass eine gutartige Riesenzellengeschwulst nach der Behandlung boesartig werden kann. Betont wird die diagnostische Bedeutung der Roentgenuntersuchung fuer die fruehzeitige Entdeckung der Geschwuelste und ihrer Metastasen. Chirurgische Behandlung wird empfohlen, und zwar wird in Faellen von gutartigen und leicht boesartigen Geschwuelsten der totalen Exzision mit anschliessender Knocheneinpflanzung der Vorzug gegeben, waehrend als Behandlung hochgradig maligner Tumoren die Amputation, wenn irgend moeglich, angeraten wird. Die Roentgenstrahlen gehoeren zu den bedeutendsten Hilfsmitteln in der Diagnostik und koennen sich letzten Endes auch in der Behandlung als das Mittel der Wahl erweisen. Moderne aspetische chirurgische Technik, verbesserte Anaesthesieverfahren, die Anwendung von Antibiotika und neue Wege der Blutstillung und Schockverhuetung haben zu den ausgezeichneten Erfolgen, die heute erreicht werden, beigetragen.

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Significance and Management of Acute Spontaneous Thrombophlebitis in the Superficial Veins of the Lower Extremities

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MUCH has been written about thrombophlebitis of the deep veins. The chief interest of this paper lies in thrombophlebitis occurring in the surface veins of the lower extremities, about which not much has been written in recent years. Since the veins involved are superficial, the disease process can be seen and felt. We wish to emphasize the fact that the spontaneous onset of thrombophlebitis in a surface vein has broad implications, requiring differential diagnosis and individualized treatment.

The spontaneous onset of thrombophlebitis in superficial veins of the lower extremities may indicate one of the following processes: 1. Simple thrombophlebitis in varicose veins occurring as a result of venous stasis and minimal trauma. 2. Evident superficial thrombophlebitis with hidden and dangerous concomitant thrombophlebitis of the deep veins. 3. The initial sign of Buerger's disease (thromboangiitis obliterans). 4. Migratory phlebitis. 5. Malignant disease.

The significance of 49 personally observed cases of acute spontaneous thrombophlebitis of the superficial veins of the lower extremity is indicated in Table 1.

Spontaneous Acute Thrombophlebitis in Varicose Veins (26 Cases).—This is a common complication of varicose veins. Usually the larger veins are affected, and frequently the varicosities have existed for fifteen or twenty years before the onset of thrombophlebitis. On the other hand, the onset of spontaneous acute thrombophlebitis may be the first indication that the patient has varicose veins.

The clinical signs of this condition are obvious. There is a linear area of redness, tenderness and induration in line with the great saphenous vein or one or more of its branches. The area of inflammation is somewhat broader than the underlying, obviously thrombosed saphenous vein. Other unoccluded varicose veins are present in the same extremity. Generally the process progresses upward, a few additional inches of the vein becoming involved daily. The venous involvement is frequently considerably higher than the clinical signs would indicate.

Although frequently much higher than is suspected, the process will usually stop abruptly at the saphenofemoral juncture, and this takes place even though the thrombotic process appears on the abdomen in the superficial epigastric and circumflex iliac branches. Extension into the femoral vein rarely occurs by ascending thrombosis. Extension into the deep venous system is usually via the communicating veins, and this is the explanation of secondary involvements of the deep veins and pulmonary embolism from acute superficial thrombophlebitis.

Treatment.—Acute thrombophlebitis in the varicosed saphenous system may be treated medically or surgically. Medical management consists of the following

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measures: 1. Continued ambulation unless pain makes this prohibitive. 2. Application of a pressure pad over the great saphenous vein above the thrombophlebitic process. 3. Support and partial immobilization of the inflamed area with an Unna paste boot. 4. Anticoagulant therapy (usually with Dicumarol).

The medical treatment is relatively safe provided the patient is kept ambulatory. The process will subside in one to two weeks, leaving a painless, well-thrombosed vein. The "cure" will, however, be only temporary. A permanently thrombosed vein is the exception rather than the rule. Within a few months the lumen of the vein will be patent again, owing to recanalization, and the vein will be more varicosed than ever owing to the further destruction of its valves. Actually, the larger the varicosities and the more massive the thrombophlebitis, the sooner recanalization and resumption of the varicose state appear. If medical treatment is elected, a high ligation and stripping should be performed at a later date.

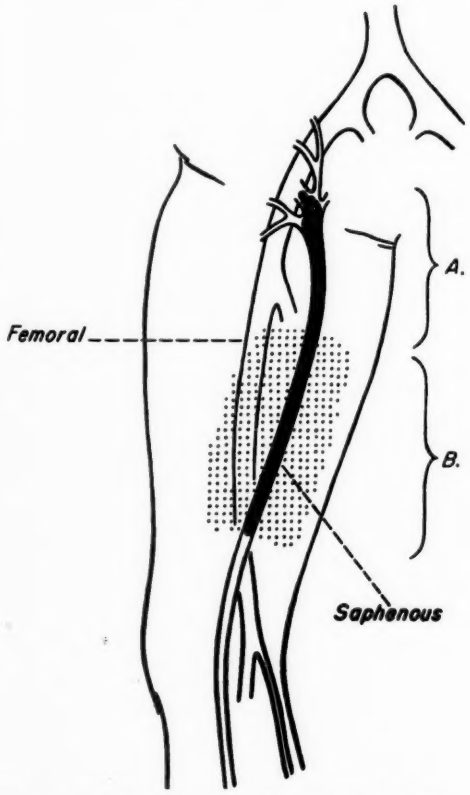

Fig. 1.—Proof that area of thrombosis is higher than is evidenced clinically. *A*, clinically unsuspected area of thrombosis. *B*, area of clinically evident thrombophlebitis.

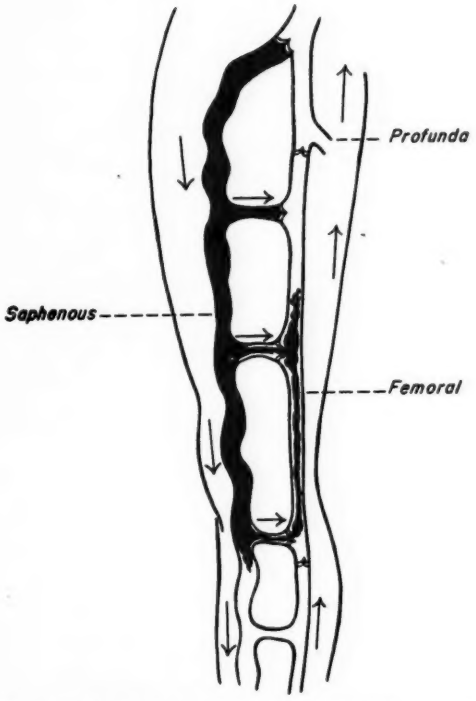

Fig. 2.—Mechanism of extension into the deep vein. Spontaneous acute ascending thrombosis usually ends abruptly at the saphenofemoral junction. Extension into the deep veins usually occurs through the communicating veins.

Bed rest and icepacks have no place in the therapy of acute thrombophlebitis in varicose veins. Cold produces vascular spasm and promotes thrombosis. Bed rest facilitates propagation of the thrombosis upward and through the perforators, increasing the danger of deep venous involvement and pulmonary embolism. *Bed rest, moreover, slows down the healing process, and I have seen the disease remain in a subacute or chronic state for*

TABLE 1.—*Diagnosis of Forty-Nine Cases of Spontaneous Acute Thrombophlebitis in the Surface Veins*

Thrombophlebitis in varicose veins	26
Superficial and deep thrombophlebitis	15
Buerger's disease	3
Migratory phlebitis	4
Malignant disease	1
Total	49

TABLE 2.—*Management of 26 Cases of Spontaneous Acute Thrombophlebitis in Varicose Veins*

A. *Treatment by single or multiple surgical procedures*	24
High saphenous ligation on involved side	24
High saphenous ligation and stripping on involved side	12
Thrombectomy at saphenofemoral juncture on the involved side	5
Simultaneous high ligation on opposite side	14
Simultaneous ligation and stripping on opposite side	11
B. *Medical management only*	2
Results	
Uneventful recovery	20
Postoperative pulmonary embolism	1
Death*	1
Other postoperative complications**	4

*A 47-year-old bookkeeper had a high ligation of the saphenous vein on the involved side (left), and a high ligation and stripping on the opposite side. The postoperative course in the hospital was normal. The patient died suddenly at his home two weeks after the operation. Autopsy showed coronary infarction. There were no signs of pulmonary embolism.

**Two patients continued to have episodes of superficial thrombophlebitis after a high ligation of the saphenous vein and stripping. One of these proved to have Buerger's disease; the other had migratory phlebitis. A third patient was given anticoagulant therapy for a week prior to operation on the saphenous vein, because of suspected deep venous thrombophlebitis. The postoperative course was normal, but several weeks later the thrombophlebitis recurred, requiring bilateral superficial ligation of the femoral vein. In a fourth patient, ligation of the left saphenous vein and thrombectomy were performed for pulmonary embolism. There was a normal postoperative course. Three months later the patient had an episode of pulmonary embolism, for which bilateral superficial ligation of the femoral vein was performed. A thrombus was observed in the left femoral vein. The patient recovered.

weeks or months under such management.

I recommend immediate surgical intervention for spontaneous acute ascending thrombosis in the varicose saphenous system, for the following reasons:

1. High ligation of the saphenous vein causes rapid resolution of the inflammatory process. It is the quickest and surest way of curing the patient.

2. The danger of embolism is reduced—rapid resolution of the process stops the tendency toward spread through the perforator veins into the deep venous system.

3. The most important step in the therapy of the patient's varicose veins is accomplished.

The simplest of the surgical procedures is high ligation of the saphenous vein. In most instances the operation is identical with that performed for uncomplicated varicose veins. Occasionally the process will be found to have extended to the saphenofemoral juncture. In such instances, safe ligation of the saphenous vein requires a thrombectomy. Figure 3 illustrates the procedure as performed by myself. The steps are as follows:

1. Make a horizontal incision, 1 to several cm. above the crease in the groin, depending upon the obesity or nonobesity of the patient.

2. Incise Camper's fascia and isolate the saphenous vein.

3. Open the vein between two small clamps on its anterior surface and extract the clot, as much as possible from the lower segment and partially from the upper segment.

4. Divide the vein and ligate the lower end.

5. Place small mosquito clamps about the circumference of the open upper end of the vein, and dissect this end to its juncture with the femoral vein.

6. Split open the anterior wall of the upper segment of vein almost to the femoral juncture.

7. Elevate markedly the head of the operating table and remove with suction or gallstone forceps the clot in the upper saphenous stump.

8. Continue this extraction until a good flow of blood is encountered from above, even though this necessitates inserting the forceps through the saphenofemoral juncture into the femoral vein.

9. Ligate the saphenous stump flush with the femoral vein.

10. Proceed with the usual ligation and division of the tributary branches at the saphenofemoral juncture.

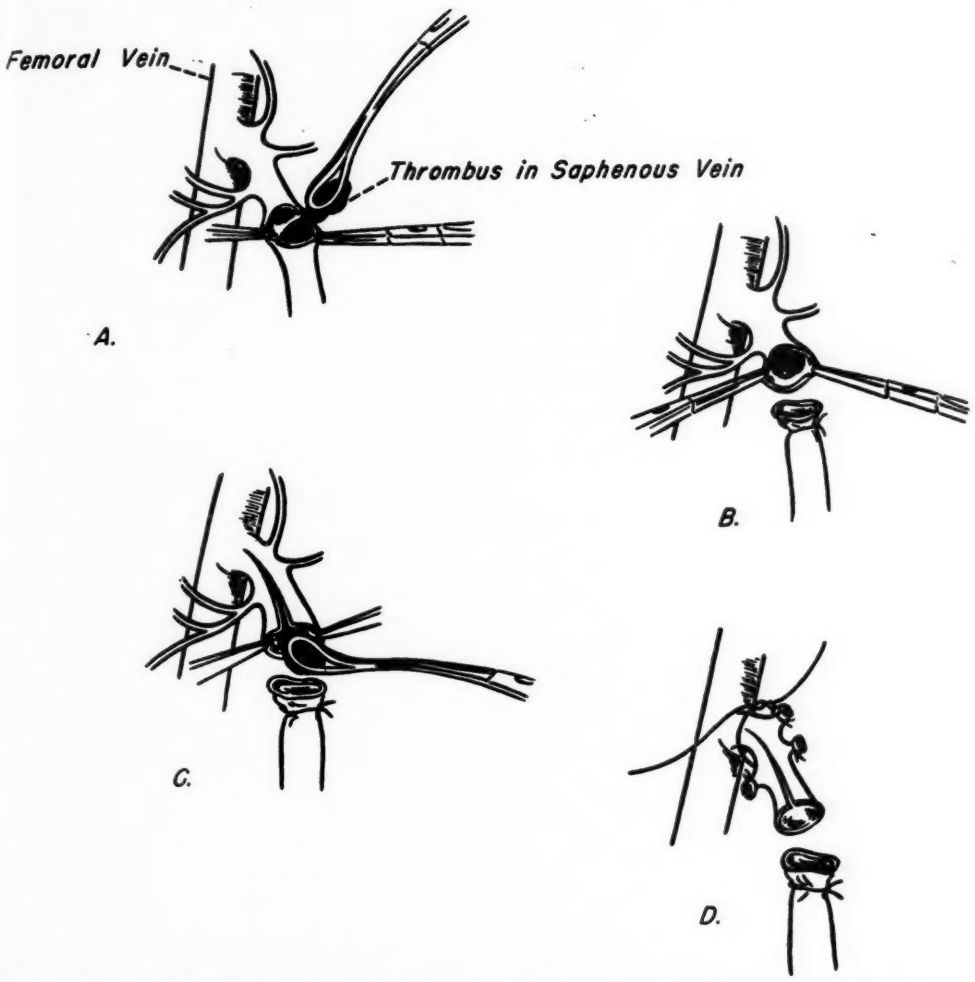

Fig. 3.—Ligating the saphenous when thrombophlebitis has ascended to the femoral junction. *A*, anterior wall of saphenous incised and thrombus extracted from the lower end. *B*, vein divided. The lower end is ligated and upper end left open. *C*, anterior wall of upper end split upward to femoral junction and clot extracted. *D*, saphenous vein and its branches ligated.

It has been indicated that a high ligation of the saphenous vein assures the rapid resolution of the thrombophlebitic process. There remains the problem of eradicating the varicose veins in the presence of thrombosis. I attempt to resect as much of the varicose saphenous system as possible at the same operation, except in the presence of acutely inflamed lesions. Unless this is done, the thrombosed area will recanalize over a period of time, and the patient may have further thrombophlebitic episodes in spite of a saphenous ligation. I have not hesitated to strip out the varicosities above and below the thrombosed area, excise the thrombosed areas, or incise the thrombosed area. Incision of the thrombosed area for relief of tension is practical and affords the patient a great deal of relief. When

the condition is subacute I have emptied the thrombosed vein segment of clotted blood with stone forceps or a curet, and then removed the segment by a stripping technic using the extraluminal stripper of Mayo. If varicosities exist in the opposite leg, they are removed by high ligation and stripping during the same operation.

Anticoagulant therapy is employed routinely in postoperative care. It is continued for several weeks after the patient leaves the hospital and is discontinued gradually rather than abruptly.

Table 2 indicates the treatment of my 26 patients with spontaneous acute thrombophlebitis in varicose veins. Cases in which I performed my combined ligation of the saphenous and femoral veins are excluded from this table.

There were no deaths attributable to the surgical procedure, although 1 patient died of coronary disease two weeks after the operation. Simultaneous stripping of the saphenous vein on the involved side and high ligation and stripping of the varicosities of the opposite leg did not increase morbidity. In only 1 case did symptoms and signs of pulmonary embolism develop postoperatively, and in this case the patient rapidly recovered.

Anticoagulant therapy, prior to operation on the saphenous vein for deep venous phlebothrombosis, was unsatisfactory. The deep venous process was prone to recur. A second hospitalization was required for ligation of the superficial femoral vein in 2 instances. Both a superficial femoral and a saphenous ligation should be performed in all cases in which there are suspicious signs of phlebothrombosis in the veins of the calf, complicating spontaneous thrombophlebitis of the surface veins. This principle is further discussed in the next section.

Clinically Evident Thrombophlebitis in the Superficial Veins and Hidden Thrombophlebitis in the Deep Veins.—I have implied that spontaneous acute thrombophlebitis in the saphenous system is usually benign. On the other hand, the readily visible and palpable surface lesion may indicate that the patient is dangerously ill with latent deep venous thrombophlebitis. This possibility should be considered in every case of spontaneous acute thrombophlebitis of the surface veins. Unfortunately, there may be a coexisting deep venous lesion with a total absence of symptoms and signs of its presence. This fact was tragically brought home to me a number of years ago. The patient had undergone hysterectomy ten days earlier and was ready to go home. The nurse called my attention to a linear area of redness and hardness along the mesial aspect of the right calf. After a cursory examination, I ordered wet compresses and dismissed the matter as of trivial significance. One hour later the patient was dead. Autopsy showed superficial and deep thrombophlebitis and pulmonary embolism. In my opinion, involvemen of the deep vein should be presumed to exist whenever pulmonary embolism occurs, even though the examiner can detect a surface lesion only. Almost invariably the source of the embolism will be thrombophlebitis of the deep veins rather than the clinically evident lesion (Figs. 4 and 5).

Deep venous thrombophlebitis complicating thrombophlebitis of a surface vein is suggested by: (1) a past history of iliofemoral thrombophlebitis; (2) deep calf tenderness; (3) a positive result from the dorsiflexion test; (4) edema of the leg; (5) faint violaceous color of the skin, and (6) decreased amplitude of femoral pulsation in the groin.

Needless to say, the signs and symptoms of deep venous involvement may be very obscure. Arterial spasm from an adjacent thrombophlebitic area may be the only clinical evidence of the venous disease. This sign is best elicited by comparing the femoral pulsations in the two groins.

The surgical importance of realizing that thrombophlebitis exists in both the superficial and the deep venous systems is obvious. Treatment of the surface lesion to the exclusion of the deep process may well spell death for the patient.

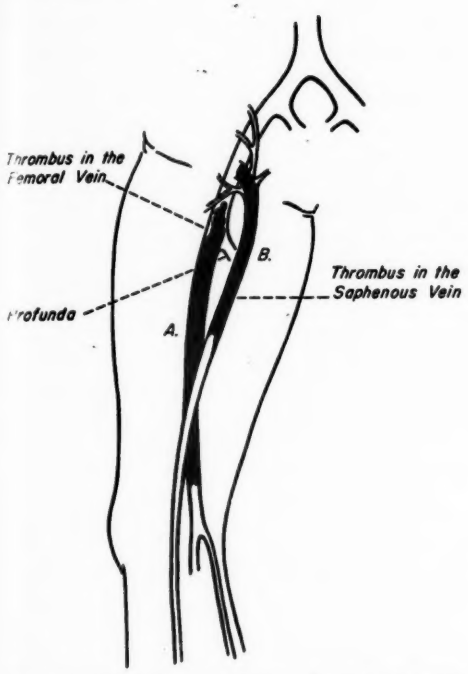

Fig. 5.—Evident saphenous thrombophlebitis, latent deep vein thrombophlebitis and pulmonary embolism.—In *A*, thrombophlebitis existed in the femoral vein without any signs or symptoms and was the source of the embolism. In *B*, thrombophlebitis was clinically evident in the long saphenous vein.

REPORT OF TWO CASES

CASE 1.—H. M., aged 55, convalescent from an attack of coronary artery thrombosis, was suddenly attacked by pain in the left side of the chest, shortness of breath and hemoptysis. His physician observed an area of acute thrombophlebitis in the varicosed saphenous vein in the midthigh and made a diagnosis of pulmonary embolism originating from this lesion. High ligation of the saphenous vein was performed as an emergency measure. The left saphenous vein was thrombosed at the saphenofemoral juncture, and a saphenous vein thrombectomy was performed and the vein ligated. The right saphenous vein was likewise ligated. The patient made an uneventful recovery, and was discharged from the hospital in two weeks.

Several months later the patient was rehospitalized with a second episode of pulmonary embolism. Careful examination of the legs furnished only suggestive evidence of deep venous thrombophlebitis—diminution of the force of pulsation in the left femoral triangle. A bilateral exploration of the superficial femoral vein was performed. The left femoral vein contained a nonobstructing, partly organized thrombus. Left thrombectomy was performed, and both superficial femoral veins were ligated just distal to the femoral profunda. The patient recovered rapidly and had no further embolic episodes during the succeeding year.

CASE 2.—H. M., aged 65, was sent to the hospital because of pneumonia with recurrent relapses. The hospital consultant observed an area of superficial thrombophlebitis in the upper third of the left thigh and made a

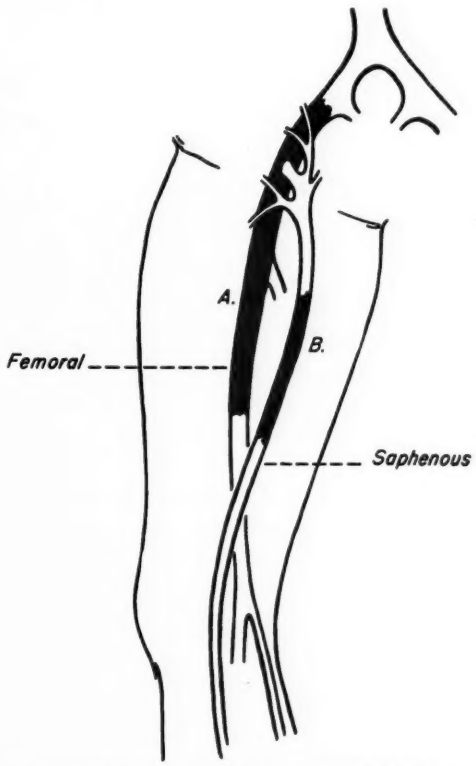

Fig. 4.—Evident saphenous thrombophlebitis, latent deep vein thrombophlebitis and pulmonary embolism.—In *A*, thrombophlebitis existed in the femoral vein without any signs or symptoms and was the source of the embolism. In *B*, thrombophlebitis was clinically evident in the long saphenous vein.

TABLE 3.—*Analysis of 15 Cases of Combined Superficial Thrombophlebitis and Deep Venous Thrombophlebitis**

Evident thrombophlebitis in the surface veins	15
Suggestive or definite signs of deep venous phlebitis	11
Absence of signs of deep venous thrombophlebitis	3
Past History of deep venous thrombophlebitis	1
Pulmonary embolism	7
Treatment	
Ligation of saphenous vein	15
Thrombectomy of saphenous vein	3
Ligation of femoral vein	15
Thrombectomy of femoral vein	5
Results	
Recovered	14
Died (not operated on)	1

*In 4 cases an interval of time separated the attacks of thrombophlebitis in the superficial and deep veins, so that the operations were similarly staged. In such cases the patients are presumably "clotters" and have repeated episodes of thrombophlebitis of the superficial or deep veins until bilateral saphenous and a bilateral femoral ligation have been performed.

diagnosis of recurrent pulmonary embolism originating from this lesion. The presence of a slightly positive reaction to the dorsiflexion test and the suggestion that the attacks of pneumonia were embolic led to exploration of the femoral vein of each leg and of the saphenous vein on the left. The thrombus in the saphenous vein had extended to the femoral juncture, but there it ended abruptly. Femoral exploration revealed a red, partly organized thrombus, more or less completely occupying the upper part of the left femoral vein. The thrombus was removed from the left saphenous vein by the technic previously described, and the vein was ligated at its juncture with the femoral. A thrombectomy was performed through the left superficial femoral vein, and this vein was ligated at the point of entrance of the femoral profunda. The right superficial femoral vein was likewise ligated. The patient made an uneventful recovery. Without exploration of the deep venous system this patient might well have lost his life.

I recommend exploration of both the saphenous and the femoral veins in all instances of spontaneous thrombophlebitis of the saphenous system when suggestive evidence exists of deep venous involvement or when pulmonary embolism has occurred. Simultaneous exploration of the saphenous and femoral veins is performed through separate incisions—a horizontal incision above the crease in the groin for the saphenous ligation, and a vertical incision in the upper third of the thigh for the femoral vein. The procedure is illustrated in Figure 6.

Regional Heparinization Following Venous Thrombectomy. — The procedure of thrombectomy, whether of the superficial or the deep venous system, has much to condemn it. The thrombus is often removed "piecemeal", with no assurance of a job thoroughly done. Furthermore, it is not uncommon for mild episodes of pulmonary embolism to follow the procedure. Interruption of the main venous trunk well above the thrombophlebitic process is the procedure of choice; however, the condition of the patient may well contraindicate such an extensive operation, and certainly ligation of the vena cava is not to be undertaken lightly. I have incorporated regional heparinization in the thrombectomy operation to lessen the incidence of postoperative embolism. In a series of 4 cases, the results have been gratifying. One patient, after leaving the hospital, had a mild episode of pain in the chest, presumably embolic. All of the other patients improved markedly under the procedure and had no complications. All recovered. In addition to lessening the postoperative recurrence of thrombosis and the likelihood of pulmonary embolism, the procedure appears to have a highly salutory effect on the thrombophlebitic process itself. The leg swelling and signs of venous insufficiency rapidly disappear, and the leg presents a normal appearance within a few days. Figure 6 shows the polyethylene catheter tied into the stump of the superficial femoral vein for regional heparinization. Five hundred cc. of heparin in water is alternated with 500 cc. of heparin in saline solution. Fifty mg. of heparin is added to each 500 cc. of solution.* The systemic coagulation time is maintained at approximately eight minutes. Presumably, the coagulation time is much more prolonged in the iliac vein. The catheter is withdrawn at the end of five

*When placed on the market, Armour's new intravenous Trypsin will probably be used instead of Leparin.

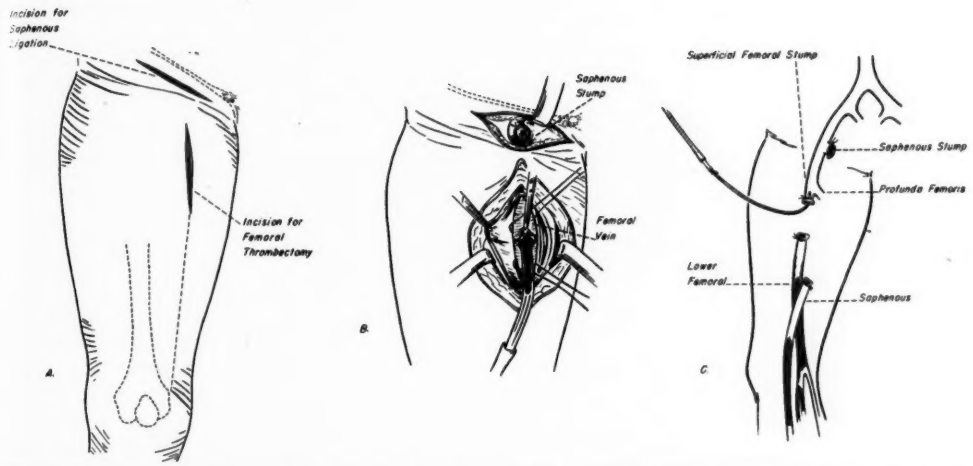

Fig. 6.—Combined saphenous and femoral exploration and regional heparinization.—*A*, two incisions are used: a horizontal one above the crease in the groin for the saphenous, and a vertical one in the upper third of the thigh for the femoral. *B*, the saphenous vein is ligated in the usual manner. The thrombus is being extracted from the femoral. *C*, the lower femoral is emptied of thrombus and ligated; the superficial femoral is ligated at point of entrance of the femoral profunda. A polyethylene catheter is fixed in the ligated femoral stump for regional heparinization.

days. A venogram may be taken prior to its removal, if desired.

My experience with 15 cases of thrombophlebitis of the saphenous and deep veins is presented in Table 3.

Acute Thrombophlebitis of the Superficial Veins as a Sign of Buerger's Disease (Thromboangiitis Obliterans).—Thrombophlebitis of the superficial veins occurs in 20 to 30 per cent of cases of thromboangiitis obliterans. When the surface veins are varicosed, the condition is readily mistaken for thrombophlebitis resulting from venous stasis, and the true arterial nature of the disease is overlooked. The thrombophlebitis of thromboangiitis obliterans usually attacks the smaller veins of the foot or the areas about the ankle or the lower part of the leg. The signs are indistinguishable from those of migratory phlebitis. Evidences of coexisting arterial insufficiency, such as diminution of pulsation in the dorsalis pedis, or posterior arteries or reduced oscillometric readings, should lead to the proper diagnosis. Needless to say, the investigation of any venous problem of the lower extremities should include an evaluation of the status of the arteries.

Saphenous ligation (or ligation and stripping) is contraindicated in treatment of the thrombophlebitis of Buerger's disease. The episodes will continue in spite of resection of the main saphenous system. Complete cessation of the use of tobacco, anticoagulant therapy and lumbar sympathectomy are the mainstays of treatment.

REPORT OF A CASE

Mr. N., a 30-year-old machinist, complained of pain and swelling about the outer side of the ankle, of about three weeks' duration. A second red streak developed two weeks later in the lower third of the leg, along the mesial aspect. Approximately six months earlier the patient had had similar episodes. When he consulted me, there was an area of thrombophlebitis involving the varicosed saphenous vein along the mesial aspect of the calf. As oscillometric readings were somewhat reduced, and as the patient was a heavy smoker, I suspected that he had Buerger's disease; however, ligation of the saphenous vein was performed because of the ascending nature of the thrombophlebitic process. The venous segment involved in acute thrombophlebitis

was excised. Microscopic study revealed the typical lesions of Buerger's disease—the pathologist reported thickening of the intima and infiltration of the vein wall with leukocytes, histiocytes and lymphocytes. Convalescence was complicated by further episodes of superficial thrombophlebitis, which finally ceased with complete abandonment of tobacco and a prolonged course of anticoagulant therapy.

Migratory Phlebitis.—Migratory phlebitis is clinically indistinguishable from the superficial phlebitis of Buerger's disease. The process usually involves the smaller veins of the saphenous system but may involve the main long saphenous trunk or even the deep veins. The veins may be nonvaricosed or varicosed. Women as well as men are affected. The inflammation is more closely confined to the vein wall than is spontaneous thrombophlebitis from stasis in varicose veins. Usually only one small segment of the vein is involved, but there may be several lesions at one time in various stages of inflammation. The episodes recur over a period of weeks or months.

Treatment: In my opinion, surgical treatment is contraindicated for migratory phlebitis. The attacks will continue in spite of high ligation of the saphenous vein or ligation plus radical removal of most of the great saphenous system by stripping. Anticoagulant therapy and cessation of the use of tobacco seem to be the treatment of choice. Roentgen therapy may be of value for a local lesion. Cortisone may be tried, but thus far I have not had sufficient experience with it to report its value. It is to be emphasized that the surgeon who routinely performs a saphenous ligation and stripping for thrombophlebitis in varicose veins should be on guard lest he unwittingly employ these procedures in a case of migratory phlebitis.

REPORT OF A CASE

B., aged 35, a fireman, injured his foot while on the job. A week later, pain and soreness developed over the dorsal aspect of the foot. Subsequently, linear areas of inflammation developed along the mesial aspect of the ankle and leg, in line with the long saphenous vein. Because of recurring attacks of thrombophlebitis in what appeared to be branches of the varicosed saphenous system, high saphenous ligation and stripping was performed. The immediate postoperative period was normal, but the patient was given anticoagulant therapy. Several weeks after his discharge from the hospital and after the anticoagulant therapy had been stopped, there was a recurrence of thrombophlebitis. Anticoagulant therapy was resumed, but the patient continued to have thrombophlebitis in various branches of the saphenous system over a period of three months after the operation on the saphenous vein. He refused to stop smoking.

Thrombophlebitis as Evidence of Obscure Visceral Malignant Disease.—Recurrent thrombophlebitis may be the first sign of obscure visceral malignant disease. Instances have been reported in which thrombophlebitis was the only abnormality observed until the patient's death.

The usual diagnosis has been obscure cancer of the pancreas or lung. That symptoms of malignant change in these organs may be minimal or absent is a well-known fact. The explanation of the tendency toward thrombophlebitis in the presence of malignant disease is not known. Presumably the coagulability of the blood is increased. Invasion of the vena cava may explain the increased incidence of thrombophlebitis in association with malignant disease of the pancreas. Tumor emboli from the lung, passing through the pulmonary veins to the heart, may be distributed throughout the body. This explains the widespread metastases of cancer of the lung and may explain the widespread occurrence of thrombophlebitis in some such cases. It is said that the speed of blood flow in arteries prevents lodgement of tumor emboli in them; however, such emboli may well lodge in the venous end of the capillary loop and initiate thrombophlebitis.

Thrombosis of multiple vessels was observed at autopsy in the case here reported below. Cancer cells were not observed in the emboli, and it was presumed that the tiny cancer emboli, not detectable micro-

scopically, set up local vascular irritation to produce thrombophlebitis.

REPORT OF A CASE

S., aged 45, previously in good health, noticed a burning pain along the inner aspect of his left leg just above the knee. At about the same time there was loss of sensation over the left side of the face. The attending physician made a diagnosis of acute thrombophlebitis of the left saphenous vein and cerebral embolism. It was presumed that the thrombus reached the brain through a patent foramen ovale. The surgeon performed a saphenous ligation. The patient was discharged from the hospital apparently well but returned shortly thereafter because of evidences of bilateral deep venous thrombophlebitis in the calves. Bilateral ligation of the superficial femoral vein was performed. Postoperatively the patient had several episodes of thoracic pain, dyspnea and hemoptysis, interpreted as attacks of pulmonary embolism. It was thought that the emboli originated from the iliac veins proximal to the femoral ligations, and a caval ligation was suggested but refused by the patient. Thrombophlebitis developed in the brachial vein, the axillary vein and the external jugular vein on the left after an intravenous infusion, and the infusion was presumed to have been the cause of the process. Clinical evidences of further attacks of thrombophlebitis were no longer observed, but the patient continued to go downhill and finally died. At autopsy an adenocarcinoma was observed, arising from a bronchus at the apex of the left lung. There were metastases to the liver, spleen and lymph nodes. Tumor emboli were observed in many blood vessels throughout the body. There were infarcts in the brain, kidneys, spleen, lungs and legs.

Certain features characterize the thrombophlebitis of malignant disease: 1. The attacks are recurrent and widely spaced in time. 2. Veins of widely separated parts of the body become involved. 3. The individual episodes of thrombophlebitis are apt to be mild and of short duration. 4. The attacks are uninfluenced by anticoagulant therapy or the usual vein ligations. 5. The patient remains ill between the thrombophlebitic episodes.

In the case here reported the patient was given anticoagulant therapy most of the time. At widely separated intervals there developed thrombophlebitis of: (1) both long saphenous veins; (2) both femoral veins, and (3) the left brachial and axillary veins. There was clinical evidence of pulmonary and cerebral embolism.

SUMMARY

1. The spontaneous onset of thrombophlebitis in the superficial veins of the lower extremities may indicate: (a) Thrombophlebitis in varicose veins; (b) superficial thrombophlebitis with concomitant deep vein thrombophlebitis; (c) Buerger's disease; (d) migratory phlebitis, or (e) malignant disease.

2. The author recommends immediate surgical intervention for spontaneous acute thrombophlebitis in varicose veins. In addition to a high ligation of the saphenous vein, varicosities of the affected limb are removed by stripping and resection. The acute thrombophlebitis is not infectious and is not considered a contraindication to such surgical treatment.

3. When thrombophlebitis in the saphenous vein has ascended to the saphenofemoral juncture, safe ligation requires thrombectomy. The technic is described.

4. Every case of thrombophlebitis of surface veins may be complicated by a similar process in the deep veins. Evidences of a deep vein process may be minimal. The author recommends exploration of both the saphenous and the femoral veins in all instances of spontaneous thrombophlebitis when there is evidence suggestive of deep venous involvement or when pulmonary embolism has occurred. The technic of simultaneous exploration of the saphenous and femoral veins is described.

5. Regional heparinization is advocated as an adjuvant to venous thrombectomy.

6. The paper includes case reports of spontaneous superficial thrombophlebitis as a manifestation of Buerger's disease, migratory phlebitis and latent visceral malignant disease.

RESUMEN

El ataque espontáneo de tromboflebitis en las venas superficiales de los miembros inferiores puede indicar: (a) tromboflebitis en venas varicosas; (b) tromboflebitis superficial con tromboflebitis profunda concomitante; (c) enfermedad de Buerger; (d) flebitis migratoria; (e) neoplasia maligna.

El autor recomienda la intervención quirúrgica inmediata para la tromboflebitis aguda espontánea en venas varicosas. Además de una ligudura alta de la vena safena, se extirpan las varicosidades del miembro afectado por denudación y resección. No se considera contraindicación para dicho tratamiento quirúrgico, dado que la tromboflebitis aguda no es infecciosa.

Se describe la técnica para la trombectomía cuando la seguridad de la ligadura lo requiere, en casos en los que la tromboflebitis de la safena ha ascendido hasta unión safenofemoral.

Los casos de tromboflebitis superficial pueden complicarse con un proceso similar profundo. Son mínimas las evidencias sobre proceso venoso profundo. El autor recomienda la exploración tanto de la safena como de la femoral, en todos los casos de tromboflebitis espontánea en que exista evidencia de complicación profunda o cuando haya ocurrido embolismo pulmonar. Se describe la técnica para esta exploración.

Se invoca ña heparinización regional como adyuvante en la trombectomía venosa.

Se incluyen en este artículo comunicaciones sobre tromboflebitis superficial espontánea sintomática de enfermedad de Buerger, flebitis migratoria y neoplasis maligna visceral latente.

RIASSUNTO

1. L'inizio spontaneo della tromboflebite nelle vene superficiali dell'arto inferiore può significare: (a) tromboflebite in vene varicose; (b) tromboflebite superficiale con tromboflebite profonda associata; (c) malattia di Buerger; (d) flebite migrante; (e) tumore maligno.

2. L'autore raccomanda l'intervento chirurgico immediato nei casi di tromboflebite spontanea acuta di vene varicose: legature alta della safena associata resezione ed sportazione delle varici dell'arto malato. La tromboflebite acuta non èinfettiva e non deve essere considerata una controindicazione alla cura chirurgica.

3. Quando la tromboflebite è risalita dalla safena alla confluenza safenofemorale, la legatura deve essere preceduta dalla trombectoria. Ne viene descritta la tecnica.

4. Ogni caso di tromboflebite delle vene superficiali può essere complicato da analogo processo nelle vene profonde. Di quest'ultimo può esserci solo qualche minimo segno. L'autore raccomanda di esplorare entrambi i sistemi, femorale e safeno, in tutti i casi di tromboflebite spontanea, quando vi siano i segni di interessamento venoso profondo o quando si manifesti embolia polmonares. Viene descritta la tecnica della esplorizione simultanea delle vene safena e femorale.

5. L'eparinizzazione regionale viene raccomandata come aggiunta alla trombectomia venosa.

6. Il lavoro comprende anche la relazione di casi di tromboflebite spontanea superficiale come manifestazione di morbo di Buerger, di flebite migrante e di neoplasia maligna viscerale latente.

RÉSUMÉ

1. Le début de la thrombo-phlébite spontanée des veines superficielles des extrémités inférieures est découvert; (a) par la thrombo-phlébite des veines variqueuses; (b) la thrombo-phlébite superficielle concomittant avec les veines profondes; (c) la maladie de Buerger; (d) la phlébite migratoire, ou (e) les maladies malignes.

2. L'auteur recommande l'opération immédiate pour les thrombo-phlébites aigues des veines variqueuses. Après ligature haute de la veine saphène, on enlève les varicosités du membre affecté par tor-

sion et résection. La thrombo-phlébite aigue n'est pas une maladie et n'est pas considérée comme une contr'indication au traitement chirurgical.

3. L'auteur décrit le procédé de la thrombectomie, procédé employé quand il est impossible, dans la thrombo-phlébite, de réséquer la veine saphène, à cause de sa position trop haute dans la jointure fémorale de la saphène.

4. Tous les cas de thrombo-phlébite en surface peuvent être compliqués dans les veines profondes. Il est parfois trés difficile de voir si la veine est profonde. L'auteur recommande l'exploration et de la veine saphène et de la veine fémorale dans la thrombo-phlébite spontanée, quand il y a évidence d'envahissement des veines profondes et lorsque des signes pulmonaires se manifestent. Description de ce procédé.

5. Dans la thrombectomie, on peut emplyer l'Héparine.

6. Ce travail comporte aussi l'étude de certains cas de thrombo-phlébites superficielles, comme dans la maladie de Buerger, les phlébites migratoires et la maladie maligne.

ZUSAMMENFASSUNG

1.) Das ploetzliche Auftreten einer Thrombophlebitis in den oberflaechlichen Unterschenkelvenen kann der Ausdruck folgender Krankheitszustaende sein: a.) Thrombophlebitis in Varizen, b.) oberflaechliche Thrombophlebitis als Begleiterscheinung einer Thrombophlebitis einer tiefen Vene, c.) Buergersche Krankheit, d.) wandernde Venenentzuendung, e.) boesartige Erkrankung.

2.) Zur Behandlung der spontanen akuten Venenentzuendung in Krampfadern empfiehlt der Verfasser sofortiges chirurgisches Eingreifen. Neben hoher Unterbindung der V. saphena wird eine Entfernung der Krampfadern des befallenen Gliedes durch Herausziehen und Resektion vorgenommen. Die akute Thrombophlebitis ist nicht infektioes und stellt keine Kontraindikation eines solchen chirurgischen Verfahrens dar.

3.) Wenn eine Thrombophlebitis der V. saphena bis zur Einmuendungsstelle des Gefaesses in die V. femoralis aufgestiegen ist, wird zur Erzielung einer sicheren Unterbindung eine Thrombektomie notwendig. Die Technik wird beschrieben.

4.) Jeder Fall von oberflaechlicher Thrombophlebitis kann durch aehnliche Prozesse in den tiefen Venen kompliziert sein. Die Anzeichen der Beteiligung der tiefen Vene koennen aeusserst gering sein. Fuer alle Faelle von spontaner Thrombophlebitis, in denen ein Verdacht der Beteiligung tiefer Venen vorliegt, oder in denen eine Lungenembolie aufgetreten ist, empfiehlt der Verfasser die Explorierung sowohl der V. saphena als auch der Femoralvene. Die Technik gleichzeitiger Explorierung beider Venen wird beschrieben.

5.) Oertliche Heparinisierung wird zur Unterstuetzung der Thrombektomie empfohlen.

Die Arbeit enthaelt Krankheitsberichte von Faellen spontaner oberflaechlicher Thrombophlebitis als Ausdruck Buergerscher Erkrankung, wandernder Venenentzuendung und latenter boesartiger Erkrankungen der Eingewirde.

SUMARIO

1. O ataque expontaneo de tromboflebite nas veias superficiaisdas extremidades inferiores pode indicar (a) tromboflebite em veias varicosas; (b) tromboflebite superficial com tromboflebite concomitante de veia profunda; (c) doença de Buerger; (d) flebite migratoria ou (e) doença maligna.

2. O autôr recomenda intervenção cirrugica imediata para tromboflebite aguda expontanea em veias varicosas. Em adição a alta ligadura da veia safena, varicosidades do membro afetado são removidas por arrancamento e resecção. A tromboflebite agudo não é infeciosa e não é considerada uma contraindicação a tal tratamento cirurgico.

3. Quando a tromboflebite na veia safena ja ascendeu a uniao safeno-femural, a ligaçao livre de perigos requer trombectomia. A tecnica é descrita.

4. Cada caso de tromboflebite de veias superficiais pode ser complicado por um processo similar nas veias profundas. A evidencia de um processo nas veias profundas pode ser minima. O autôr recomenda a exploração de ambos as veias safena e femural em todos os casos de tromboflebite expontanea quando ha evidencia sugestiva de envolvimento venoso profundo e quando embolia pulmonar ocorre. A tecnica de exploração. simultanea das veias safena e femural é descrita.

5. Heparinização regional é aconselhada como um adjuvante de trombectomia venosa.

6. O trabalho inclue relatorio de casos de tromboflebite expontanea superficial, como uma manifestação de doença de Buerger, flebite migratoria, e doença de malignidade visceral latente.

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Announcement

International Section of Occupational Surgery

The Executive Council of the United States Section and the Board of Trustees of the International College of Surgeons have unanimously approved the formation of an International Section of Occupational Surgery, the aims of which are (*a*) elevation of standards for the practice of occupational surgery, (*b*) conservation of the health of the worker after occupational injury, (*c*) official recognition of this specialty, (*d*) stimulation of interest in this field by students and members of the profession, and (*e*) cooperation in the establishment of facilities for graduate education in occupational surgery by means of residencies in hospitals affiliated with medical schools, or their equivalents.

For further details, address Dr. Chester Guy, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Lumbar Sympathectomy for Advanced Occlusive Peripheral Arteriosclerosis

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SAN FRANCISCO

REMOVAL of the second and third lumbar sympathectic ganglions and the intervening trunk has been done 82 times in seventeen years for occlusive arteriosclerosis of the lower extremities in our Department of Sympathetic and Vascular Surgery. In all cases the sympathectomy has been accomplished by the Pearl muscle-splitting extraperitoneal approach,[1] and microscopic examination of excised tissue has confirmed the removal of sympathetic nerve structures. There have been no deaths and very few complications attributable to the procedure. The operation has been exceptionally effective in preserving limbs threatened with amputation and has afforded noteworthy relief to a goodly percentage of patients suffering from symptoms caused by deficient arterial circulation.[2] These results are the more gratifying in that progressive degenerative occlusive arterial disease has been notably refractory to treatment, leading only too frequently to loss of limb or incapacity.

Prior to surgical intervention, the degree of vasoconstriction in 78 of these 82 extremities was estimated by measuring the maximum extent of skin warming after procaine block of the posterior tibial nerve under controlled temperature conditions. Block of this mixed nerve produces anesthesia of the soles and tips of the toes, with complete vasoconstrictor release in the area of sensory loss. The maximum temperatures are reached in from thirty to one hundred and twenty minutes after the onset of anesthesia.

We propose here to resurvey the effects of sympathectomy in the cases of advanced obliterative arteriosclerosis of the extremities. For this purpose we have selected for review those cases in which neither femoral, popliteal nor pedal pulses were palpable (Group I), and those in which the femoral pulse was palpable but the popliteal and foot pulses absent (Group II). Each of these groups will also be considered in relation to its preoperative surface temperature response after posterior tibial nerve block.

Of the total of 82 cases in which the extremities were sympathectomized for obliterative arteriosclerosis, 44 have already been reported in detail from our clinic by Pearl and Rosenman.[2] These comprise all operative cases from 1934 to December 1947. The remaining extremities were sympathectomized from January 1948 to July 1951. These will be reported in detail elsewhere. As our experience increased, our indications for operation, based on the favorable results in earlier cases, were progressively liberalized. Thus, in the first ten years (1934-1944) 26 patients were considered suitable for operation; none of these had an absent femoral pulse. In the remaining six and a half years we operated on 56 extremities; of these, 12 had absent femoral pulses. In the first ten years each of the 26 extremities had a normal or nearly normal vasodilation level (30.5 C.) after posterior tibial nerve block. In the past six and a half years, 22 of the 56 extremities operated on reached temperatures of only 26 C. or less after the block (Fig. 1).

Group I: Pulseless Extremities.—Twelve patients were subjected to sympathectomy. In these, no pulsations whatever were obtained—femoral, popliteal or pedal (Table 1). The symptoms varied in

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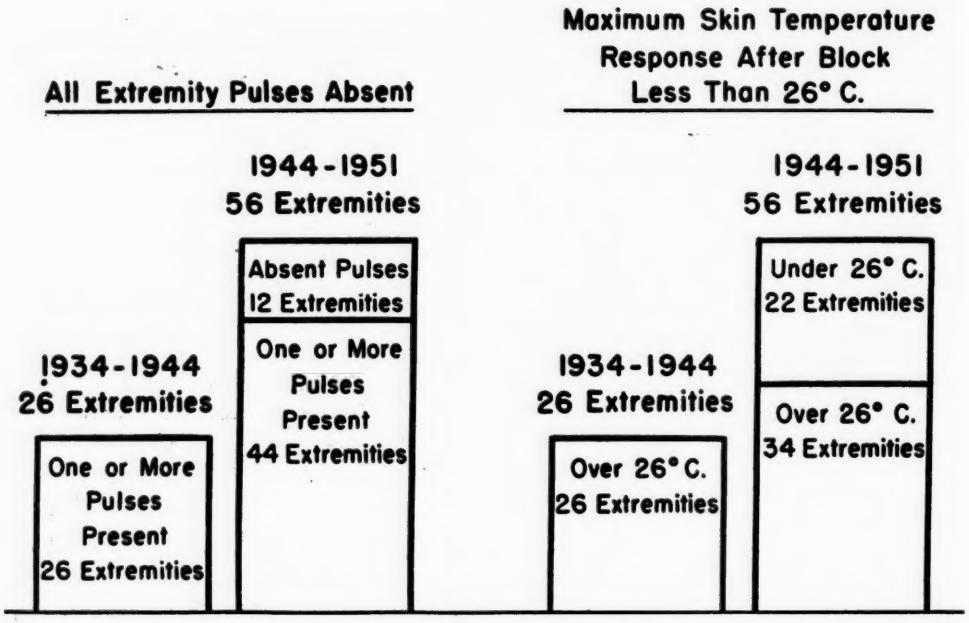

Fig. 1.—Liberalization of indications for lumbar sympathectomy; role of absent pulses and skin warming.

duration from less than one month to five years. Before the operation 9 of the 12 could walk less than one city block, and 3 could walk from one to three city blocks. None had significant elevation of skin temperature after preoperative posterior tibial nerve block. For 5 of these 12 patients amputation was necessary, in 4 cases within a few weeks and in 1 case after eighteen months. Seven extremities survived; 2 have claudication after a few steps, 4 after one block and 1 after 1½ blocks. One of the patients whose extremity survived has a persistent ulcer but has improved in walking ability. The two with claudication after a few steps each had ulcers, which healed after surgical intervention.

In assessing the results of operation in this group, one must consider that these were all "desperate cases." Of the 5 patients who came to amputation, 3 had chronic ulceration, 1 for five years; 1 had acute arterial occlusion, and 1 had a discolored, cold, painful, atrophic foot. We know of no other recognized method of treatment in general use at that time which would have been effective in preserving the extremities of these patients. Recent attempts to restore the circulation to the lower extremities by thromboendarterectomy, alone or combined with lumbar sympathectomy, may prove more efficacious in selected cases. All required amputation because of the development of frank gangrene. In our opinion the operation did not contribute to this in any way. The extremities that survived represent a salvage of limbs destined for amputation prior to sympathectomy.

Group II: Extremities with Only the Femoral Pulse Palpable.—Lumbar sympathectomy was done on 31 extremities in which the femoral artery gave the only palpable pulsation (Table 2). Before the operation 17 patients had claudication after walking less than one level city block, and none could walk more than three blocks. After sympathectomy, walking ability was increased in 22, unchanged

in 6 and decreased in 3 (Fig. 2). Four of those whose walking ability was unchanged had preoperative pregangrenous states following acute arterial occlusion. Of the 3 whose claudication became worse, 2 were relieved of rest pain, and 1, chronically alcoholic, finally came to amputation eight months later because of a deep ulcer that failed to heal. The operation was effective also in the relief of pain, numbness and coldness in most instances.

In all of 10 patients with acute occlusion of the femoral or popliteal artery, the limb was preserved. After the operation 2 of these had no claudication; 7 could walk one to three city blocks, and 1 had claudication in less than one city block.

Thus, nearly every one of the 31 extremities in this group had significant benefit from sympathectomy. Fourteen of the patients were able to carry on normal or nearly normal activity. The results in this group are far better than those in which the femoral pulse was not palpable.

Prognostic Significance of Preoperative Estimates of Vasoconstriction. — After posterior tibial nerve block, 12 extremities had no rise of temperature or a rise

TABLE 1.—*Twelve Extremities Without Femoral or Other Pulses Subjected to Sympathectomy*

	Preoperative		Postoperative	
Extremity No.	Claudication; Level Walking Distance	Other Symptoms and Observations	Claudication	Other Symptoms and Observations
1	Indefinite until acute occlusion	Acute occlusion; coldness; numbness; pain		Gangrene developed; amputated in 1 month
2	Severe, few steps	Ulcer toes	Severe (same) after 4 months	Ulcer healed
3	Severe, few steps		Severe (same) after 4 months	
4	Moderate, one and one half block	Ulcer 5 years		Gangrene developed; amputated in 2 weeks
5	Severe, one block		Severe (same) after 8 months	Numbness and pain in toes
6	Severe, one block	Discolored toes; ulcer; pregangrenous	Severe (same) after 8 months	Ulcer healed; toes remained discolored
7	Severe, one block	Ulcer foot; coldness; pain; discoloration		Gangrene developed; amputated in 1 week
8	Severe, one block	Discoloration; coldness; pain		Gangrene developed; amputated in 1 week
9	Severe, few steps	Ulcer toe; painful, discolored foot	Severe but improved to 1 block	Ulcer still present but foot not painful or discolored
10	Severe, few steps	Painful, discolored foot	Severe but improved to 1 block	Color improved; pain persists
11	Moderate, more than one block	Ulcer toe, ten days		Ulcer healed, then recurred, and gangrene developed; amputated after 18 months
12	Moderate, more than one block	Ulcer; healed preoperatively	Moderate (same)	No further ulceration

TABLE 2.—*Thirty-One Extremities Without Popliteal or Foot Pulses Subjected to Sympathectomy*

	Preoperative		Postoperative	
Extremity No.	Claudication; Level Walking Distance	Other Symptoms and Signs	Claudication	Other Symptoms and Signs
1	Severe, half block		Mild (5 blocks) after 3 years	
2	Severe, one block		Moderate (3 blocks) after 8 months	
3	Severe, few steps		Moderate (1-3 blocks) after 4 months	
4	Severe, half block	Sudden occlusion, cold below knee	Moderate (two blocks) after 7 months	Gangrene averted; ulcer developed on 5th toe, which healed
5	Severe	Sudden occlusion, cold numb leg	None (any distance slowly) after 27 months	Gangrene averted
6	Moderate, two blocks	Sudden occlusion. Toes blue and cold. Pregangrenous	Moderate (two blocks) after 2 months	Gangrene averted
7	Moderate, two blocks	Cold leg	Moderate (two blocks)	Leg warm
8	Severe, one block	Cold foot	Moderate (three blocks) after 32 months	Warm foot
9	Severe, one block	Cold foot	Moderate (three blocks) after 32 months	Warm foot
10	Severe, one block	Cold, numb foot. Possible occlusion femoral artery	Severe (one block)	Gangrene averted; femoral artery pulsated
11	Severe	Cyanosis toes	Mild after 44 months	Cyanosis disappeared
12	Moderate	Discolored toes	Mild after 43 months	
13	Moderate		Moderate after 6 years	
14	Severe	Acute thrombosis popliteal artery	Moderate after 33 months	Ulcer developed 5 months postoperatively, which healed; femoral artery thrombosis 24 months postoperatively; recovered
15	Moderate	Ulcer 4th toe	None after 45 months	Ulcer healed
16	Moderate		Mild after two years	Foot warmer
17	Moderate	Severe foot pain	None after 33 months	No pain
18	Severe	Sudden onset; popliteal artery thrombosis	Moderate after 26 months	Leg survived
19	Severe	Sudden onset; probable thrombosis	None after 18 months	Leg survived
20	Moderate		None after 18 months	
21	Moderate	Severe pain	Mild after 48 months	No pain
22	Moderate	Severe pain	Mild after 48 months	No pain

TABLE 2 *(cont'd.)—Thirty-One Extremities Without Popliteal or Foot Pulses Subjected to Sympathectomy**

	Preoperative		Postoperative	
Extremity No.	Claudication; Level Walking Distance	Other Symptoms and Signs	Claudication	Other symptoms and Signs
23	Severe	Severe pain; coldness; acute thrombosis	Moderate after 5 months	Limb survived
24	Moderate	Acute thrombosis	Moderate after 9 months	Limb survived
25	Severe	Ulcer 5th toe, one month	None after 50 months	Ulcer healed
26	Severe	Severe pain, cold foot, ankle ulcer, 2 years		Ulcer worse; low thigh amputation in 8 months
27	Severe	Ulcer healed preoperatively	Mild after 19 months	
28	Severe	Healed ulcer 3rd and 5th toes; severe ulcer first toe	Mild after 19 months	Ulcer healed
29	Moderate	Severe heel pain	Severe after 20 months	No pain
30	Moderate	Severe pain; cold cyanotic foot	Severe after 20 months	No pain
31	Moderate	Severe pain; sudden onset	Moderate	Limb survived

*"Severe claudication" indicates walking ability of less than one level city block; moderate claudication indicates ability to walk one to three level city blocks, and mild claudication is ability to walk more than three level city blocks.

TABLE 3.—*Preoperative Maximum Skin Temperature After Vasoconstrictor Paralysis in Relation to Postoperative Walking Ability*

Preoperative Rise	No. of Extremities	Improved	No Improvement	Worse[1]
26 C. or less	12[2]	4	4	4
Over 26 C.	27	18	6[3]	3[4]

1. Five of the 7 extremities in this column came to amputation. Four of these 5 had no pulses.
2. In 7 of these 12 the extremities were pulseless.
3. One of the extremities showing no improvement had a rise in temperature to just 26 C.
4. One of the extremities made worse had a rise to just 26 C.

to less than 26 C.; of these, 7 had no femoral or other palpable pulses. Four of the 12 came to amputation, 4 showed improvement in walking ability, and 4 obtained no such benefit (Fig. 3).

Twenty-seven extremities showed maximum skin warming to more than 26 C. after nerve block. Of these, claudication was improved in 18, unchanged in 6 and worse in 3. One of these 3 came to amputation. The extremity that came to amputation and 1 of the other 2 in which walking ability became worse showed increases in skin temperature to just 26 C.

From these data (Table 3) it appears that extremities in these groups in which

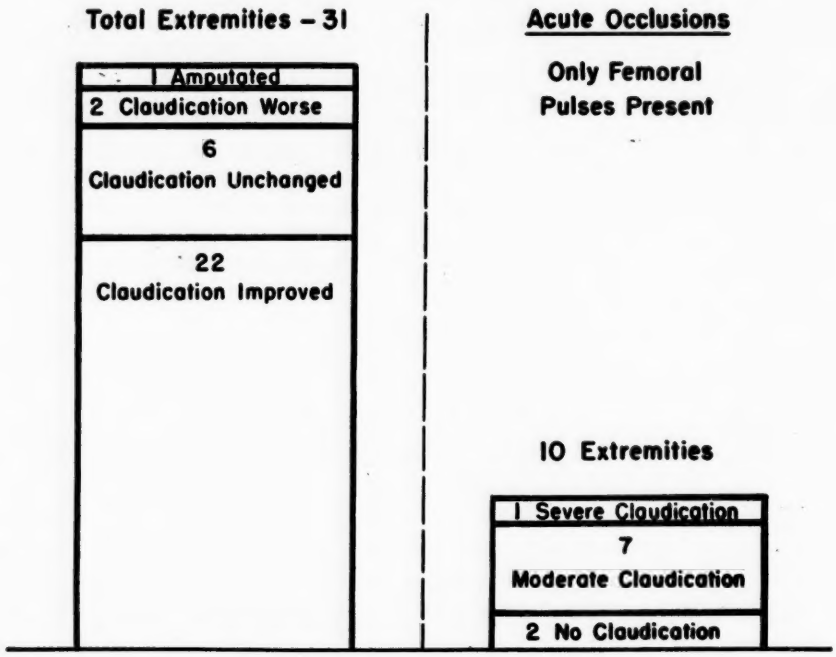

Fig. 2.—Effect of sympathectomy on claudication in extremities with only a femoral pulse.

significant warming of the skin occurred after nerve block are more likely to obtain a good result from sympathectomy. However, the failure to obtain significant skin warming after nerve block does not preclude a favorable outcome.

SUMMARY

Lumbar sympathectomy for 12 pulseless lower extremities from obliterative arteriosclerosis (Group I) was followed by gangrene and amputation in 5 and survival of the limb in 7. These were all desperate conditions headed for amputation, other methods of therapy giving no promise of benefit.

Lumbar sympathectomy was done on 31 extremities with only a femoral pulse (Group II). Claudication was improved in 22, unchanged in 6 and worse in 3. Rest pain, coldness, and numbness were markedly improved in nearly all. One came to amputation. Significant benefit occurred in almost every case.

Survival of the limb followed operation in all of 10 cases in which acute occlusion of the femoral or popliteal artery preceded operation. After operation these limbs have had good or fair function.

In those extremities which showed evidence of a considerable element of vasoconstriction the results were better than in those with a small vasoconstrictor element. Extremities with little or no warming of the skin after nerve block may show a favorable result from lumbar sympathectomy.

Lumbar sympathectomy has been proved to give good results in the treatment of advanced obliterative arteriosclerosis of the lower extremities.

SUMARIO

A simpatectomia lombar foi executada 82 vezes em nosso departamento de Cirurgia Simpatica e Vascular para tratar

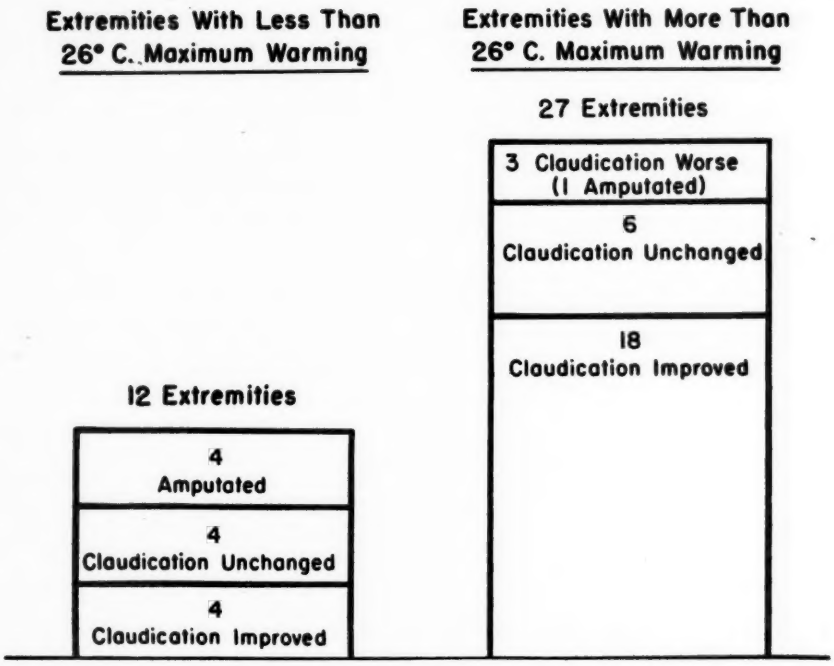

Fig. 3.—Relation of preoperative vasoconstriction to postoperative claudication and amputation.

arteriosclerose oclusiva das extremidades inferiores. Doze extremidades não tinham pulso algum. Cinco dos pacientes deste grupo vieram a amputação, 7 sobreviveram. Trinta e uma extremidades tinham somente um pulso femural. Neste grupo, 1 paciente vein a amputação, 22 melhoraram sua habilidade em andar, e aproximadamente todos foram aliviados de suas dores, dormencia e resfriamento. Dez extremidades com pulsos femurais mostraram oclusão aguda subita da arteria femural ou poplitéa e todos os pacientes sobreviveram depois da simpatectomia. Estimativas preoperatorias do gran de vasoconstrição foram feitas medindo—se a temperatura da pele a apos bloqueio do nervo tibial posterior. As extremidades que exhibiram um consideravel elemento de vasoconstrição mostraram melhores resultados com a operação do que aquelas sem tais elementos, mas a ausencia de um elemento vasoconstritôr não impede um bom resultado.

RESUMEN

Los autores han empleado la simpaticectomía lumbar 82 veces para tratar arterioesclerosis oclusiva de los miembros inferiores. Doce miembros no tenían pulso a pesar de todo. Cinco de los pacientes de este grupo fueron amputados, habiendo sobrevivido ciete. Treinta y un miembros tuvieron sólo pulso femoral. En este grupo, un paciente fué amputado, veintidos pudieron caminar mejor y se obsevó mejoría en cada uno de ellos del dolor, el entumecimiento y el enfriamiento. Diez miembros con pulso femoral mostraron oclusión aguda repentina de la arteria femoral o de la poplítea, habiendo sobrevivido todos los pacientes después de la simpaticectomía. Se efectuaron estimaciones preoperatorias del grado de vasoconstricción, mediante mediciones de la temperatura cutánea después del bloqueo del nervio tibial posterior. Los miembros que presentaban considerable elemento de

vasoconstricción mostraron mejores resultados que los que no lo presentaban, pero la ausencia de un elemento vasoconstrictor no impidió un buen resultado.

ZUSAMMENFASSUNG

In der Abteilung fuer Chirurgie des Sympathikus und der Gefaesse wurden 82 lumbale Sympathektomien zur Behandlung obliterierender Arterienverkalkung der unteren Gliedmassen ausgefuehrt. Darunter hatten 12 Gliedmassen ueberhaupt keinen Puls. Fuenf dieser Kranken wurden amputiert, sieben ueberlebten. 31 Extremitaeten zeigten Pulsation ausschliesslich an der Femoralarterie. An einem Kranken dieser Gruppe wurde eine Amputation ausgefuehrt, 22 zeigten eine Verbesserung der Gehfaehigkeit, und fast alle wurden von ihren Schmerzen und von Taubheits-und Kaeltegefuehlen befreit. Zehn Gliedmassen mit Femoralpuls zeigten einen akuten Verschluss der Femoral- oder Poplitealarterie; alle diese Kranken ueberlebten die Sympathektomie. Eine Schaetzung des Grades der Gefaessverengung vor der Operation wurde durch Messung der Hauttemperatur nach Blockierung des hinteren Tibialnerven vorgenommen. Extremitaeten mit Gefaessverengungen betraechtlichen Grades erfuhren durch die Operation bessere Resultate als solche ohne Vasokonstriktion; das Fehlen des gefaessverengenden Elements schloss jedoch die Moeglichkeit eines guenstigen Ergebnisses nicht aus.

RIASSUNTO

Sono state eseguite, nel nostro reparto di chirugia simpatica e vascolare, 82 simpaticectomie lombari per la cura di trombosi arteriosclerotiche degli arti inferiori. In 12 arti non vi era alcuna pulsazione: 5 di questi pazienti furono amputati e 7 sopravvissero. In 31 arti vi era solo il polso femorale: 1 fu amputato, 22 migliorarono le possibilità di marcia e in quasi tutti fu domato il dolore e il senso di intorpidimento e di freddo.

In 10 casi con polso femorale presente comparvero occlusioni acute improvvise della femorale o della poplitea e tutti i pazienti sopravvissero dopo simpaticectomia.

La valutazione preoperatoria del grado di vasocostrizione fu ottenuta con misurazioni della temperatura cutanea dopo blocco del nervo tibiale posteriore.

Gli arti che presentavano vasocostrizione grave ottennero i migliori risultati dall'intervento, benchè la assenza di vasocostrizione non escluda un risultato soddisfacente.

RÉSUMÉ

La sympathectomie lombaire a été pratiquée 82 fois dans notre département de Chirurgie Sympathique et Vasculaire pour traiter l'artériosclérose des membres inférieurs.

12 cas n'ont pas revu de pulsation; 5 cas sont devenus des amputés; 7 ont survécu; 31 n'ont eu qu'une pulsation de la fémorale. Dans ce dernier groupe, 1 patient fut amputé; 22 faisant des progrès dans leur marche et presque tous soulagés de leur douleur, picottement et froideur. 10 cas ayant seulement la pulsation fémorale ont eu une occlusion aigue soudaine de l'artère fémorale ou de l'artère poplitée et tous ces patients ont survécu aprés la sympathectomie.

Le degré de vasoconstriction pré-opératoire a été établi en prenant la température de la peau aprés le blocage du nerf tibial postérieur. Les extrémités ayant un élément considérable de vasoconstriction ont montré de meilleurs résultats aprés l'opération que celles n'en ayant pas, mais l'absence d'un élément vasoconstricteur n'exclut pas un bon résultat.

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Bilateral Pyelitis Cystica and Ureteritis Cystica: A Case Report with Six-Year Follow-Up

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WE are presenting a case of bilateral pyelitis and ureteritis cystica diagnosed roentgenologically and followed over a period of more than six years. The ureterograms and pyelograms presented in this case report give sufficient evidence to warrant the diagnosis of pyelitis cystica and ureteritis cystica. No evidence of cystitis cystica was ever observed in this case.

A thorough scrutiny of the literature reveals that Morgagni,[1] in 1761, first made mention of the condition now spoken of as pyelitis cystica, ureteritis cystica, and cystitis cystica. In both cases described by Morgagni the patients were elderly white men with bilateral hydronephrosis and hydroureters. In 1816, Johnson[2] described the case of a woman with hydronephrosis and hydroureter present on the same side as the pyelitis cystica and ureteritis cystica. Rokitansky,[3] in 1861, described this condition on the basis of postmortem observations but never expressed a definite view as to the origin of such cysts. Prior to 1876, descriptions of this condition were confined to gross pathologic studies. In 1876, Litten[4] gave the first microscopic description. This author made no mention of the presence of cell nests but expressed the opinion that the cysts were formed by inflammatory blocking of glands and crypts of the urothelium and pooling of their secretions.

The first article in the English literature appeared in 1889. It was written by Eve,[5] who reported a case and described ovoid bodies in the colloid contents of the cysts which corresponded in size and appearance to pseudo-navicellae. This convinced Eve that the cysts were the result of a parasitic infestation. There were many disciples[6] of this theory, and as late as 1938 one can find a section entitled "Psorospermiasis" in Osler's textbook of medicine.[7] To quote Osler, "the parasites are also found in the kidneys and ureters . . . the nodules throughout the pelvis and ureters have been regarded as mucous cysts."

The clinical diagnosis of pyelitis cystica and ureteritis cystica was made possible only by the introduction of roentgenologic procedures into the sphere of diagnosis and by the advent of contrast substances as an aid in diagnosis.

Despite these advances, which commenced in 1902, with the work of von Zeissl, it was not until 1929 that the first case report was made by Jacoby,[9] based on urographic evidence of ureteritis cystica in a pyelogram. In the same year, Joelson[10] reported the case of a 44-year-old white woman, who had had repeated attacks of hematuria, with urgency and frequency of urination and nocturia. On cystoscopic examination Joelson observed numerous small cysts in the region of the trigone of the bladder. These cysts varied from 2 to 4 mm. in diameter, and by means of a rongeur forceps a biopsy specimen was taken, with a subsequent diagnosis of cystitis cystica. Joelson followed this examination with retrograde pyelograms, which revealed several areas of decreased opacity both in the pelvis and in the ureter, on both the right and left side. In his opinion these pyelograms

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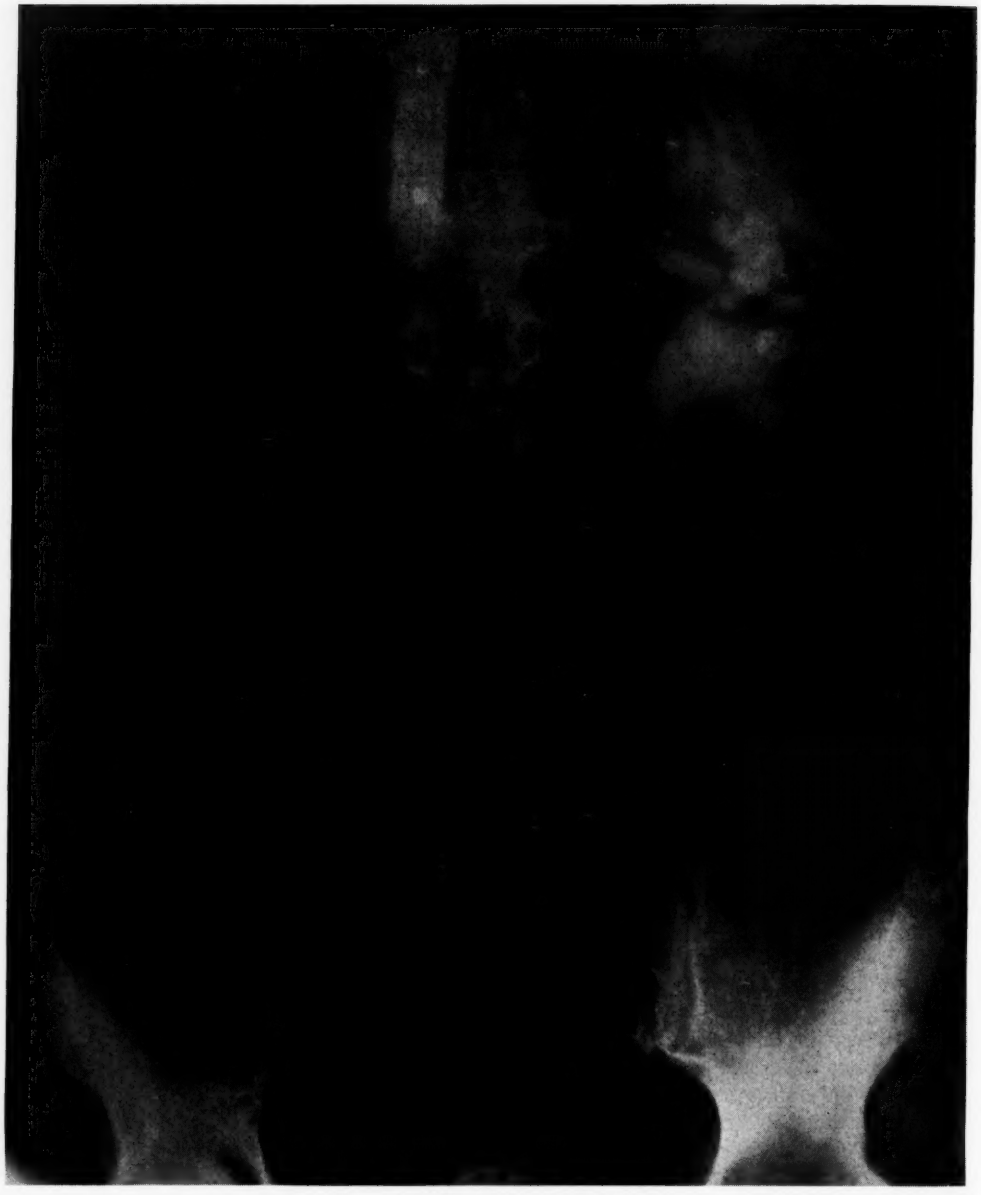

Fig. 1.—Intravenous pyelogram, August 1945. Normal right urinary tract. Dilatation of calyces and pelvis of left kidney. Dilatation of upper third of left ureter. No reference was made at this time to the presence of cystic formation. A diagnosis of left renal tuberculosis was considered.

were sufficient evidence to warrant the diagnosis of ureteritis and pyelitis cystica. In 1936, Hinman, Johnson and McCorkle[11] added three more cases of pyelitis and ureteritis cystica diagnosed by the same characteristic filling defects in the ureteropyelograms. Kirwin[12] stated that the diagnosis is easily made by retro-

grade or excretory urographic study, which will show a characteristic bubbly or frothy appearance of the ureter through more or less of its extent, due to displacement of the opaque medium by the cysts. Dilatation, tortuosity, or constriction of the ureter is a common observation, according to Kirwin. Although many subsequent reports have appeared, there is still a paucity in the literature, especially the American literature, of material on this subject.

REPORT OF CASE

The patient was R. L., a 48-year-old white man, a native of Florence, Italy, with one sibling. On Sept. 4, 1945, this patient first presented himself for examination. Prior to this date he had complained of pain in the back of about one year's duration. He had been treated by a chiropractor, with some relief. He believed that within the past three to four months he had passed some "gravel" and he had also had some vague but persistent pain in the region of the left kidney. In June he noticed some blood in his urine and consulted a physician who recommended intravenous pyelographic investigation (Fig. 1).

Intravenous pyelograms taken on Aug. 28, 1945, revealed both kidneys to be normal in size, shape and position, the left kidney being slightly larger than the right. Outlines of both psoas muscles were clearly seen. The bladder region was normal, and there was no evidence of opaque shadows in the regions of the kidneys, ureters or bladder. Films taken at intervals after intravenous injection of the dye revealed the opaque medium in the calyces and the pelves of both kidneys, in both ureters and in the bladder. The report at this time stated that the shadows seen in the right kidney, although not well defined, showed no evidence of any pathologic condition, and that the calyces and pelvis of the left kidney were dilated. The diagnosis at this time was hydronephrosis of the left kidney with some impairment of the function of the right kidney.

Previous surgical procedures included an appendectomy, performed in 1944, from which convalescence was uneventful. The family history and a systematic review, except for the genitourinary system, were noncontributory. Review of the history of the genitourinary system revealed that the patient had had enuresis until the age of 18. He had a diurnal frequency of two to three hours and a nocturnal frequency of two to three times. There was slight burning on urination, but no evidence of hematuria except on the one occasion mentioned. There was no history of venereal disease.

Physical examination revealed no abnormality except for a palpable left kidney and moderate tenderness at the left costovertebral angle.

A urinalysis revealed nothing remarkable except for a *p*H of 7.5, which persisted through numerous examinations, and occasional pus cells per high power field.

On September 4 cystoscopic study was performed. This examination revealed the absence of cystitis, diverticula, calculi or neoplasms. The ureteral orifices were of normal size, shape and position. On November 7, urine collected cystoscopically was reported as giving a negative reaction for acid-fast bacilli on smear and culture. (Subsequent studies made for acid-fast organisms also gave negative results.) At this time a left retrograde pyelogram was taken, which revealed an oval area of opaque density in the lower pole of the left kidney. This was well visualized on one film and not visualized on the film with contrast substance. The contrast substance injected into the left side of the urinary tract was insufficient to provide complete visualization of the renal sinus. There was sufficient contrast substance, however, within the kidney substance to indicate hydronephrosis. The ureter did not appear dilated, and no obstructing lesion was demonstrated. It was the impression that the obstructing lesion, if present, was in the upper portion of the left ureter. No reference was made at this time to the presence or absence of cyst formation.

A working diagnosis of left hydronephrosis was adopted, and the patient returned at stated intervals for ureteral dilatation and pelvic lavage. During this interval the patient passed a small stone, after which there was a decrease in his diurnal and nocturnal frequency as well as a decrease in the burning on urination.

On June 4, 1946, the patient reported for cystoscopic and pyelographic studies. At this time there was some diminution of the frequency, and he no longer complained of vague discomfort in the region of the left kidney. Cystoscopic examination revealed no

vesical pathologic change. A No. 6 roentgen catheter was passed on the left side, meeting no obstruction. A retrograde pyelogram was then taken (Fig. 2). A comparative study was made of these plates as well as of the plates taken in September 1945, and compared to the plates taken in August 1945. Apparently there was some improvement as far as the hydronephrosis on the left side was concerned. Again, no mention was made of the presence or absence of cyst formation.

The patient reported for dilatation of the urinary tract, and on May 1, 1947, pyelographic studies were repeated. In these the urographic examination of the left side of the urinary tract by the retrograde method was unsatisfactory because of incomplete filling of the renal sinus (Fig. 3). Again no mention was made of the presence or absence of cyst formation.

The patient did not report again for examination until July 25, 1949. At this time he stated that he had passed another small stone, as well as a great deal of "gravel." He had no specific complaints referable to either the right or the left side of the urinary tract. Urinalysis on this date revealed that the specific gravity of the urine was 1.016. Reaction: 8.2. The urine was amber and slightly turbid. There was a faint trace of albumin. Sugar was absent. There was an excess of indican. No urobilin and no bile pigments were present. Diazo tests gave negative results. Acetone and diacetic acid were absent. The value for urea was 1.55 per cent. Chlorides: 0.4 per cent. Total solids: 3.7 per cent. Leukocytes: 20-30 cells per high power field. Red blood cells: none. Mucus: no shreds visible. Cylindroids: a few. Casts: none. Epithelium: squamous, a few; vesical, moderate numbers. Amorphous urates: none. Amorphous phosphates: a moderate amount. Crystals: uric acid: none. Calcium oxalate: none. Triple phosphate: moderate numbers. Other crystals: none. No bacteriuria or other structures. Endoscopic examination on this date revealed no evidence of vesical pathologic change, and the patient was instructed to report to the hospital for a complete urologic work-up and reevaluation of the case.

On Jan. 21, 1950, cystoscopic examination was performed, and again no vesical pathologic change was encountered. Ureteral catheters were passed bilaterally without difficulty. The flow of urine from both sides was normal. Examination of both urinary tracts was made by means of retrograde pyelographic study. A scout film of the abdomen was made after insertion of catheters into both ureters, extending to the level of the third lumbar vertebra on the right side and to that of the second lumbar vertebra on the left side. Both kidneys were well demonstrated and appeared to be essentially normal in size, shape and position. Both psoas muscle shadows were well demonstrated. The films made after retrograde injection of skiodan solution demonstrated the major and minor calyces and pelves on both sides. "There are numerous small globules of air admixed with the opaque solution. The calyces and pelves are otherwise normal. The ureters are well demonstrated. The films taken following the withdrawal of the catheters showed no appreciable retention of the dye on either side. The urinary bladder appeared small and showed a serrated contour, which may be suggestive of cystitis" (Fig. 4).

In reviewing the films, we disregarded this report and were quite convinced that we had not accidentally injected any air into the pelvis of either the right or the left kidney or ureters, and that what we were dealing with in this particular case was bilateral pyelitis cystica and ureteritis cystica. Further, there was no evidence whatsoever in the repeated endoscopic studies made of this patient to substantiate a diagnosis of cystitis or cystitis cystica. We were further impressed by our inability to alter the *p*H of this man's urine over a period of several years.

In September 1950, urinalysis revealed the following data: Specific gravity: 1.018. Reaction: 8.1. Color: amber. Appearance: slightly turbid. Albumin: faint traces. Sugar: absent. Indican: an excess. Urobilin, bile pigments, diazo tests: results negative. Acetone, diacetic acid: absent. Urea: 1.65 per cent. Chlorides: 0.35 per cent. Total solids: 4.1 per cent Leukocytes: 25-30 pus cells per high power field. Erythrocytes: none. Mucus: no shreds visible. Cylindroids very few. Casts: none. Epithelium: squamous, none; other: vesical, moderate numbers. Amorphous urates: none. Amorphous phosphates: moderate amount. Triple phosphate crystals: small numbers. Other crystals: none. No marked bacteriuria or other structures.

Endoscopic examination on this date revealed nothing remarkable, and there was no evidence of cysts of the bladder. A No. 6 catheter encountered some difficulty in passage up the left ureter, but a No. 5 passed

Fig. 2.—Left retrograde pyelogram, June 1946. Slight improvement in left hydronephrosis following dilatation and pelvic lavage. No reference was made at this time to cystic changes in the mucous membrane of the left urinary tract. No endoscopic evidence of vesical pathologic change.

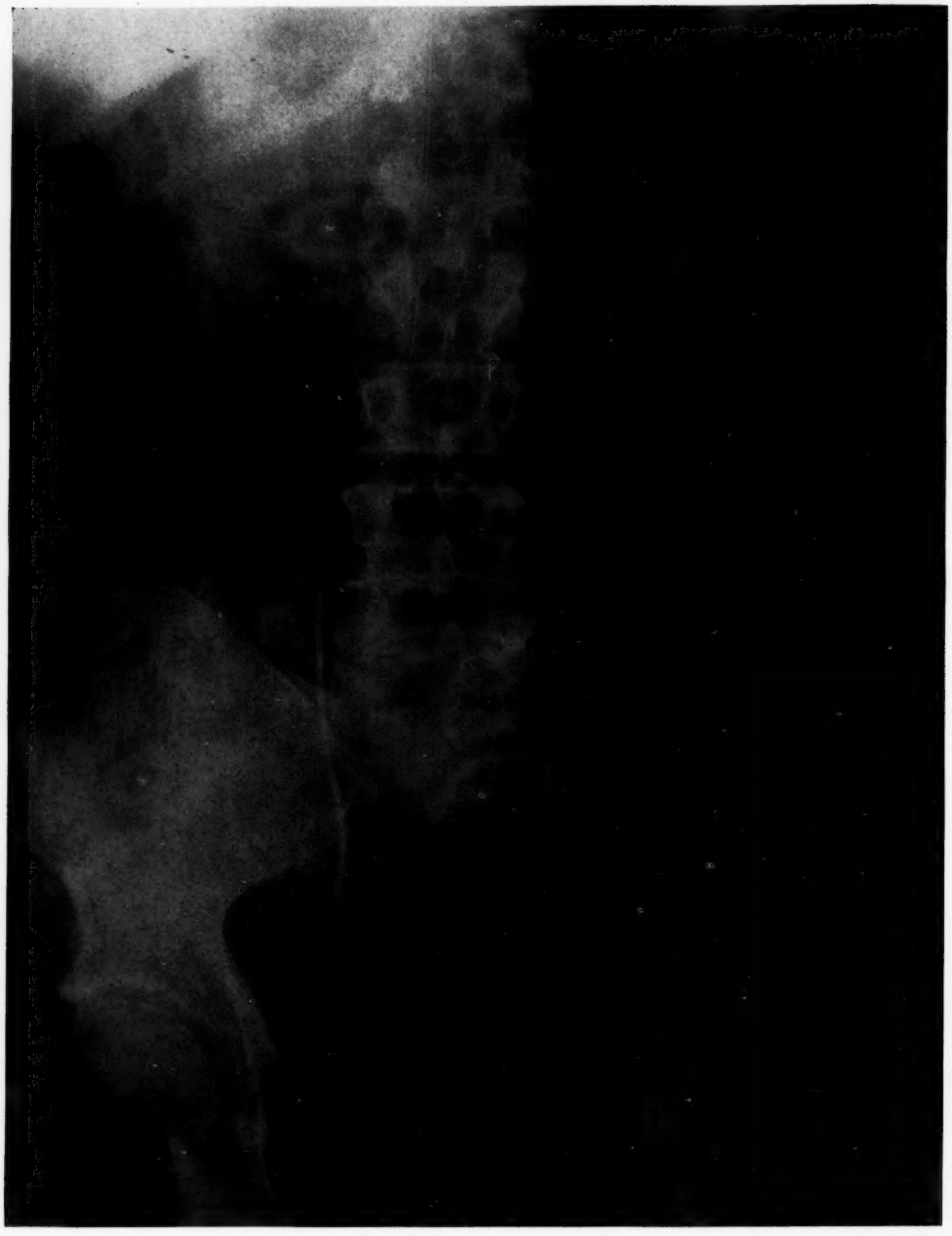

Fig. 3.—Left retrograde pyelogram, May 1947. Incomplete filling of left renal sinus (technical). No reference to presence or absence of cystic formation. No endoscopic evidence of vesical pathologic change.

to the pelvis without difficulty. In view of the presence of symptoms on the left side, it was decided to *repeat* the cystoscopic procedure, which was done on December 17, and the catheter was passed easily. For this reason it was assumed that the original difficulty had been due to spasm.

The patient returned for examination in January 1951, with the following symptoms: generalized malaise, fever, left-sided discomfort, and diurnal and nocturnal frequency. The urinalysis at this time revealed the following data: Specific gravity: 1.016. Reaction: slightly alkaline, *p*H 8.1. Color: amber. Appearance: cloudy. Albumin: faint traces. Quantitative: insufficient for estimation. Sugar: absent. Indican: an excess. Urobilin, bile pigments, diazo tests: results negative. Acetone, diacetic acid: absent. Urea: 1.45 per cent. Chlorides: 0.3 per cent. Total solids: 3.7 per cent. Leukocytes: *50 cells per field.* Red blood cells: *occasional.* Mucus: no shreds visible. Cylindroids: none. Casts: absent. Epithelium: squamous, a few; others: vesical, moderate numbers. Amorphous urates: none. Amorphous phosphates: moderate amount. Crystals: uric acid, calcium oxalate: none. Triple phosphates: a few. Other crystals: absent. No marked bacteriuria or other structures.

The patient was again admitted to the hospital for complete urologic examination. Because of recent endoscopic manipulation, cystoscopic procedures were omitted. Examination of the urinary tract was performed by intravenous pyelographic study, with the following results: A scout film showed the kidneys to be of normal size, shape and position. The psoas shadows were clearly seen. No definite evidence of opacities was observed, though some shadows having the appearance of phleboliths were observed in the lesser pelvis. A film made immediately after the intravenous injection of diodrast revealed a moderate amount of dye on both sides, indicating a satisfactory renal thrust. Subsequent films showed the calyceal structure on both sides to be essentially normal. Many radiolucent areas were noted in both upper ureters and pelves. A small calcific density was observed in the lower pole of the left kidney, near the inferior calyx. The bladder presented a normal contour (Fig. 5). A catheterized culture of bladder urine grew Bacillus pyocyaneus in pure culture.

We were convinced that we were dealing with a case of bilateral pyelitis and ureteritis cystica of several years' duration. Because of the poor response to antibiotics (this was prior to the introduction of polymyxin-B), and because of the persistence of an infection with a urea-splitting organism as manifested by persistent alkaline urine in spite of adequate dietary therapy, we decided to change our regime. It had been suggested that the oral administration of an acid, such as boric acid, might be advantageous. We therefore prescribed boric acid, 0.6 Gm. This was given orally three times a day after meals.

One month after the institution of boric acid oral medication, the patient reported for examination. At this time he stated that, although he felt a bit tired, he had noticed a marked improvement in his health and that what impressed him most was that his voided urine, for the first time in a long time, now appeared grossly clear. Although he still complained of a slight, vague discomfort in the back, he no longer had the persistent, tiring discomfort which he usually associated with the left renal region. Urinalysis at this time revealed the following values: Specific gravity: 1.016. Reaction: neutral, *p*H 7.1. Color: amber. Appearance: clear. Albumin: very faint traces. Quantitative: insufficient for estimation. Sugar: absent. Indican: moderate amount. Urobilin, bile pigments, diazo tests: results negative. Acetone, diacetic acid: absent. Urea: 1.5 per cent. Chorides: 0.3 per cent. Total solids: 3.7 per cent. Leukocytes: 25-35 cells per field. Red blood cells: none. Mucus: no shreds visible. Cylindroids: none. Casts: none. Epithelium: squamous, a few; others: vesical, moderate numbers. Amorphous urates: none. Amorphous phosphates: scanty. Crystals: scanty triple phosphates. Uric acid and calcium oxalate: none. Others: absent. No marked bacteriuria or other structures. Urine cultures taken at this time on two separate occasions revealed no growth.

In April the patient reported continued improvement and a decrease in nocturia. He stated that he no longer became fatigued easily. A urine culture at this time revealed no growth in either the twenty-four hour or the forty-eight hour culture. Boric acid capsules were now withdrawn, and the patient was told to report in a month.

The patient did not report for six months, at which time he stated that he had discontinued the boric acid therapy for several months without a return of the symptoms until recently. The discomfort and distress formerly complained of had returned to some extent, but not with the severity of his

Fig. 4.—Bilateral retrograde pyelograms, January 1950. No evidence of hydronephrosis on left side compare with Figs. 1 and 2. Definite evidence to substantiate diagnosis of bilateral pyelitis and ureteritis cystica. Note frothy, bubbly, vacuolated appearance of both upper parts of urinary tract. Note completely normal appearance of terminal portions of both ureters. Note cystic dilatation at the right and left ureteropelvic junctions. No endoscopic evidence of cystitis cystica.

original complaint. Endoscopic examination performed at this time revealed no abnormalities in the bladder. A No. 5 roentgen catheter was passed on the left side without any difficulty. Urine obtained from the left kidney was amber and clear for the first time in all the cystoscopies performed. No cultures were taken of the urine at this sitting, but the urine showed a return of reaction of a *p*H of 8.1.

On March 8, 1952, the patient reported for a check-up examination. He had been entirely free of any discomfort referable to the genitourinary system and had had no passage of "gravel." No medicaments had been taken. Urinalysis revealed the following data: Specific gravity: 1.009. Reaction: moderately alkaline, *p*H 8.4. Color: light amber. Appearance: slightly turbid. Albumin: faint traces. Quantitative: below 2 milligrams per 100 cc. Sugar: absent. Indican: traces. Urobilin, bile pigments, diazo test: results negative. Acetone, diacetic acid: absent. Urea: 0.8 per cent. Chlorides: 0.05 per cent. Total solids: 2.0 per cent. Leukocytes: 30-40 pus cells per high power field (diffused, not in cluster). Red blood cells: none. Mucus: no shreds visible. Cylindroids: none. Casts: absent. Epithelium: squamous, none; other: vesical and pelvic, a few. Amorphous urates: none. Amorphous phosphates: a moderate deposit. Crystals: none. No marked bacteriuria or other structures.

Because of his sense of well being, the patient refused cystoscopy but consented to intravenous pyelography (Fig. 6).

CONCLUSIONS

The combination of pyelitis cystica, ureteritis cystica and cystitis cystica is accepted as a definite entity in which cysts are formed in the mucosa or submucosa of the renal pelvis, the ureter and/or the bladder. Modern thinking with regard to the cause of this condition generally agrees with the thesis of von Brunn[13] set forth in 1893. He described epithelial bodies lying below the surface of the mucous membrane. If these bodies showed a connection with the surface they were termed sprouts or buds; if no connection with the surface existed they were referred to as nests. These were presumed to be formed by the downward proliferation of epithelium, occurring as a response to inflammation. In support of this idea, he showed that there were no glandular elements; that the epithelium of these bodies was similar in all respects to surface epithelium; that there was no constant lumen or exit; and that the cells did not show the ordinary changes observed in the presence of secretory epithelium. Further work by Lubarsch[14] and Giani,[15] and more recently by Bothe and Cristol[16] and others, tended to substantiate von Brunn. Marckwald,[17] in 1898, introduced a dissenting note when he encountered the condition in a newborn child and maintained that an inflammatory process was not necessary. Herxheimer,[18] however, expressed the opinion that the elimination of toxic substances was enough to explain Marckwald's case. It is further agreed that these nests can be stimulated to develop into cysts or glandular structures as the result of chronic inflammation. As Hoyt[19] pointed out, this usually means infection, but occasionally obstruction without infection or other toxic factors has been cited as the responsible agency.

There is no doubt that a definite relation exists between this lesion and chronic infection of the urinary tract. But it is difficult to accept the idea that there is a definite progressive metaplastic change that occurs in the mucous membrane of the urinary tract and that the epithelium changes from transitional epithelium to columnar and ultimately squamous epithelium. We raise this point only because, in the case here reported, there has been ample time for the mucous membrane to have been irritated and inflamed, and yet it did not necessarily undergo metaplastic changes. We were further impressed in this case by the complete absence of inflammatory changes in the bladder. As was pointed out by Bothe and Cristol,[16] the belief is that the upper part of the urinary tract is probably more frequently involved than the bladder and undoubtedly is overlooked in many cases. Kindall[20] has pointed out in his discussion of his presentation: "Many urograms in

Fig. 5.—Intravenous pyelograms, January 1951. Again no evidence of hydronephrosis of left side. Compare with Figs. 1, 2 and 4. Note frothy, bubbly, vacuolated appearance of both upper parts of urinary tract. Note completely normal appearance of terminal portions of both ureters, and cystic dilatation at right and left ureteropelvic junctions. No endoscopic evidence of cystitis cystica.

Fig. 6.—Intravenous pyelograms, March 1952. No evidence of hydronephrosis, left side. Compare with Figs. 1, 2, 4 and 5. Note pathognomonic radiographic signs such as frothy, bubbly vacuolated appearance of both upper parts of urinary tract. Also note cystic dilatation at right and left ureteropelvic junctions.

which shadows appear that have generally been interpreted as air bubbles, should have further x-ray studies to determine, if possible, whether pyelitis cystica or ureteritis cystica is present." In reviewing our own case, we most heartily agree with this last statement.

From a clinical point of view, there is nothing very characteristic of this condition. Stirling and Ash[21] stated that there are no pathognomonic symptoms, and that the disease usually occurs in elderly patients with long-standing disease of the urinary tract. Dysuria, pain in the bladder area and pain at the costovertebral angle have been mentioned as frequent signs. But one can readily see how the condition may be confused with any obstructive uropathic entity. Hinman, Johnson and McCorkle[11] cited dilatation of the ends of the major calyces with narrowing of the arms of the calyx below and cystic dilatation of the ureteropelvic junction as typical of pyelitis cystica. They also mentioned a peculiar mottling of the ureterogram, suggesting bubbles of air in the ureter, as characteristic. In our case a diagnosis of bubbles of air was indeed entertained!

The association of the condition with inflammation provides a rationale for the elimination of any infection with concomitant removal of obstructive uropathic conditions if present. Dilatation has been advocated from time to time, throughout the literature, as beneficial. But Quinby, discussing Patch's paper,[22] suggested that, since the formation of cysts is not a disease in itself but merely the pathologic response of urothelium to some antecedent cause, and since the ureters are dilated by the condition itself, it is doubtful that further dilatation could bring more than transient relief. In the case presented, dilatation only gave relief. It did not prevent or cure the underlying disease.

SUMMARY

A case of bilateral pyelitis and ureteritis cystica is reported. The conditions were diagnosed roentgenologically and the patients followed clinically, roentgenologically, bacteriologically and therapeutically for more than six years. This case demonstrates cystic proliferative changes in the mucous membrane of the upper part of urinary tract, associated with chronic infection and periodic stone formation.

The literature on this is reviewed, and the various theories concerning the cause of this entity are presented.

RÉSUMÉ

Les auteurs rapportent un cas de pyélite et d'urétérite kystique. La maladie fut diagnostiquée par la radiographie. Le patient fut suivi et traité pendant six ans par des contrôles cliniques, radiologiques bactériologiques et thérapeutiques. Ce cas illustre bien les changements kystiques de la muqueuse de l'artère urinaire supérieur, associés à une infection chronique et compliqués de lithiase urinaire.

On repasse la littérature et on discute des diverses étiologies de cette maladie.

RESUMEN

Se comunica un caso de pielitis bilateral y ureteritis quística. El diagnóstico se hizo röntgenológicamente, siendo seguidos los pacientes clínica, röntgenológica, bacteriológica y terapéuticamente por más de seis años. En el caso en cuestión se demostraron cambios proliferativos quísticos en la mucosa del segmento superior del tracto urinario, acompañados de infección crónica y formación lítica periódica. Se revisa la literatura al respecto y las teorías etiológicas sobre el particular.

ZUSAMMENFASSUNG

Es wird ueber einen Fall von doppelseitiger zystischer Pyelitis und Ureteritis berichtet. Die Erkrankung wurde roentgenologisch erkannt und der Verlauf klinisch, roentgenologisch, bakteriologisch und therapeutisch mehr als sechs Jahre lang verfolgt. Der Fall zeigte zystisch-proliferative Veraenderungen der Schleimhaut der oberen Harnwege in

Verbindung mit chronischer Infektion und periodischen Steinbildungen.

Die einschlaegige Literatur wird gesichtet und die verschiedenen Theorien der Aetiologie der Erkrankung werden dargestellt.

SUMARIO

E relatado um caso de pielite bilateral e de ureterite cistica. As condições foram diagnosticadas radiologicamente e os pacientes observados clinicamente radiologicamente, bacteriologica a terapeuticamente por mais de seis anos. Este caso demonstra alterações proliferativas cisticas na membrana nucosa da parte superior do aparelho urinario, associadas com infeções cronicas e formação periodica de calculos.

A literatura sobre o assunto é revista e as varias teorias relativas a causa desta entidade são apresentadas.

RIASSUNTO

Viene riferito un caso di pielite bilaterale e ureterite cistica. L'affezione fu diagnosticata radiologicamente e il paziente venne seguito dal punto di vista clinico, radiologico, batteriologico e terapeutico per più di 6 anni. Questo caso dimostrò modificazioni cistiche proliferative nella mucosa dei segmenti più alti delle vie urinarie, associate con infezione cronica e periodica formazione di calcoli.

Viene fatta una rassegna della letteratura e delle varie teorie relative alla causa della malattia.

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A Review of Three Hundred Cases of Protruded Intervertebral Discs Treated Surgically

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THE subject of rupture of the intervertebral disc has been highly controversial since Barr and Mixter reported their work in 1934. During the past eighteen years many thousands of patients have been subjected to operation with a diagnosis of rupture of the intervertebral disc. There is still a great deal of argument as to methods of diagnosis, proper time for operation, methods of operation and the operative procedure itself, and there is little standardization among clinics in the United States and abroad as to the proper method of handling this condition. This report deals with 300 patients operated on with a diagnosis of rupture of the intervertebral disc since 1946. We have analyzed the records of these patients with the following things in mind: First, evaluation of the clinical diagnosis and the accuracy thereof; second, the technic and accuracy of myelographic study; third, indications for operation; fourth, operative technic; fifth, secondary operations, and sixth, postoperative results.

We considered four different groups of patients; i.e., those at a veterans' hospital, those at a railroad hospital, "compensation patients" and private patients. Important symptoms and signs of diagnostic value are listed.

Clinical Features.—Incidence: Table 1 records the age incidence in this group of patients. It will be noted that the largest number were between the ages of 30 and 50, although there were 2 patients under the age of 20 and 13 over the age of 60. There was 1 patient 70 years of age. Generally speaking, this incidence corresponds to the age of the average working man, and most of the patients in this series were laboring people.

TABLE 1.—*Age Incidence in Authors' Series*

Age		Percentage
Up to 20	2/300	0.67
20-30	48/300	16
30-40	111/300	37
40-50	89/300	29.6
50-60	37/300	12.3
over 60	13/300	4.3

Sex: Seventy-seven and six-tenths per cent of our patients were male; 22.3 per cent were female. This series, however, was made up of 114 patients from the veterans' hospital (all male) and 17 patients from a railroad hospital (all male). Of the "compensation patients" there were 13 male and 5 female. With consideration of the private patients the percentage was 58.9 per cent male and 41.1 per cent female, which is a much closer figure.

TABLE 2.—*Sex Incidence in Authors' Series*

Male	233/300	77.6%
Female	67/300	22.3%

	Male	Female	Total
Veterans	114	..	114
Railroad	17	..	17
Compensation	13	5	18
Private	89	62	151

Etiologic Background: There was a history of trauma in 175 out of 300 patients, or 58.3 per cent. This is comparable to the statistics in other series of a similar kind.

Symptoms and Signs — Evaluation: Table 3 demonstrates the length of time during which our patients had suffered pain. It will be noted that 67 per cent had had pain from six months to five years and over. Only 29 per cent, or about one-fourth, were operated on with a history of pain of less than six months' dura-

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tion. All had suffered low back pain. There was radiating pain down the leg in 283 of the 300 patients, or 94.3 per cent. The pain was unilateral in 90.6 per cent and bilateral in 3.6 per cent and was accentuated on straining in 64.6 per cent. There was a positive Lasegue sign in 78 per cent of the patients; there was a negative Patrick sign in all. There was distinct sensory level of hypesthesia in 159 of the 300 patients, or 53 per cent. As a rule the hypesthesia or sensory level over the lateral aspect of the calf indicated ruptured intervertebral disc at a level between the fifth lumbar and the first sacral, while hypesthesia over the medial aspect indicated a level at the fourth and fifth lumbar. As far as the ankle jerk was concerned, 79.5 per cent showed diminished or absent ankle jerk when the rupture of the disc was at the fifth lumbar and the first sacral level, and 64 per cent showed diminished or absent ankle jerk when the rupture was at the fourth and fifth lumbar level.

TABLE 3.—*Duration of Pain*

Up to 6 months	87/300	29%
6 months to 1 year	56/300	18.6%
1 to 5 years	92/300	30.6%
Over 5 years	56/300	18.6%
Not recorded	9/300	3%

TABLE 4.—*Symptoms*

Low back pain	300	100%
Radiating pain	283/300	94.3%
Unilateral	272/300	90.6%
*Bilateral	11/300	3.6%

*Only one midline defect, hence we believe there is no definite bearing on the operative observations.

TABLE 5.—*Signs*

Positive Lasegue's sign	234/300	78%
Negative Patrick's sign	300	100%
Sensory hypesthesia	159/300	53%
Knee jerk diminished		37.5%
Ankle jerk diminished		
L-5, S-1		79.5%
L-4, L-5		64%

The Level of the Lesion.—Cervical discs are excluded from this report. Table 6 shows the level of protrusion in those instances in which a ruptured intervertebral disc was observed in this group of patients. It will be noted that by far the majority (in fact, 95.3 per cent) of all protrusions were at the fourth and fifth lumbar or the fifth lumbar and first sacral levels. There were 9 instances of multiple ruptured discs, or 3 per cent, in which 2 ruptures occurred and were verified at operation. This incidence is low compared to those in other series and is accounted for by the fact that myelograms were taken in all cases.

TABLE 6.—*Level of Lesion in Authors' Series*

L_4L_5	3/300	1%
L_5L_S	129/300	43%
L_5S_1	157/300	52.3%
2 discs	9/300	3%
L_5L_5, L_5L_5	1	
L_5L_5, L_5S_1	8	

Spinal Fluid.—The values for total protein estimation in the cerebrospinal fluid are summarized in Table 7. In 23.6 per cent of the patients there was an elevation in total protein above 50 mg. per hundred cubic centimeters.

TABLE 7.—*Values for Total Protein in Spinal Fluid*

50-100 mg. %	52/300	17.6%
100 mg. or higher	17/300	5.6%
1,000 mg.	1/300	0.33%

Fluoroscopic and Myelographic Study.—A myelogram has been taken of every patient in this series. None suffered any ill effects from this, though we have left the oil in the spinal canal in some instances and removed it in others. We have seen no ill effect from either procedure. Occasionally there is a rise in temperature; the patient has slight stiffness of the neck. If a lumbar puncture is done it will be found that the cell count has risen to one to two hundred cells. This usually disappears in two to five days. In our practice we use 4 to 6 cc. of pantopaque. In our opinion the fourth and fifth spaces in particular should be taken in both anteroposterior and both oblique views, and the upper lumbar portion of the spine, when a lumbar disc is in question, should likewise be surveyed. We consider fluoroscopic study very important. The surgeon should see the fluoroscopic image if at all possible.

In our series there were 9 instances of multiple disc rupture. These could not have been diagnosed properly without myelographic study. Furthermore, the

myelogram gives the surgeon a somewhat better idea of the location of the herniating portion of the nucleus. Frequently, when the nerve root is retracted, it is obvious that the disc is softened and degenerated, and when the ligament is opened this becomes more obvious. However, if there is a small portion of the nucleus that is herniated laterally toward the intervertebral foramen, this may be missed on occasion if the surgeon is not aware of the myelographic defect.

The accuracy of myelographic investigation in our hands may be judged by the following data: There were 22 cases, or 7.3 per cent, in which the myelographic observations were positive and the operative observations negative, no disc or protrusion being found. In 14 patients, or 4.6 per cent, rupture of the intervertebral disc was found on operation despite the fact that the myelograms had revealed no abnormality. Thus the myelogram was inaccurate in 36 of the 300 cases, an inaccuracy rate of 11.9 per cent. In 14 cases both the myelograms and the operative observations were negative. In the remainder, the lesions indicated by the myelograms corresponded with conditions observed at the operating table.

There are several things to be remembered in myelographic technic: 1. Inject above or below the suspected site of herniation, in order to avoid possible artifacts at the suspected level. 2. Do not inject into the subdural space; this makes for an "hourglass" type of artifact at each intervertebral disc, and the myelogram is completely worthless. It has been our practice to remove the needle after the pantopaque has been injected; after the fluoroscopic examination has been completed the needle can easily be reinserted through the novocaine procaine wheal already present, and we have used the needle with the double opening and found that this greatly facilitates removal of the oil. About 95 per cent of the oil can be removed in most instances.

Diagnosis.—In 265 of our 300 cases, or 88.3 per cent, a clinical diagnosis was made before myelographic investigation. In 210 out of 265, or 79.2 per cent, we were able to state that the patient had a ruptured disc, the fourth and fifth lumbar or the fifth lumbar and first sacral levels. In 185 of the 265, or 69.8 per cent, we were able to determine accurately the site of rupture at these levels.

TABLE 8.—*Diagnosis*

1. Diagnosed clinically without myelograms	265/300	88.3%
2. Clinical diagnosis, L_4-L_5 or L_5-S_1	210/265	79.2%
3. Diagnosed clinically as to exact level	185/265	69.8%

Conservative Therapy.—Most patients with pain in the back or with pain in the back and radiating pain in the leg will respond favorably to conservative therapy. In one or two instances the patients were operated on within two or three weeks after the onset of the radiating pain down the leg. By conservative therapy we mean avoidance of stooping and lifting, immobilization by a corset or a brace, bed rest either with a stiff mattress or with the mattress reinforced with boards beneath it, orthopedic manipulation, Buck's extension, massage, and diathermy. Most patients with pain in the back and leg will improve under one of these tried methods or a combination of them. It is only when these methods have been tried over a long period and have failed, and there are recurrent attacks of pain, that we have selected the patients for operation.

Mention should be made here of the psychiatric aspect of this problem. Extreme nervousness is not unusual in patients with prolonged low back pain. Needless to say, many psychoneurotics complain of backache, and it is true that many persons with *bona fide* organic low back problems are excessively neurotic. This is not difficult to understand if inquiry is made into the peregrinations of the sufferer attempting to obtain relief for his pain. If the history extends over a year or two, it often follows a pattern.

When the backache or "lumbago" first occurs, the family physician is consulted. Normally, conservative therapy is instituted and, in general, relief is obtained.

On the other hand, suppose that alleviation of pain is slow; then the time element begins to be formidable, being prolonged into weeks or months. If compensation is involved, it is apt not to meet family needs, etc. So, in desperation, the local chiropractor or osteopath is consulted, and he states that he can relocate a "slipped pelvis" or "slipped disc" with a few treatments. Hope is revived, and, quite possibly, relief is procured. The patient then returns to work, only to have pain recur after a few weeks. Now he seeks the aid of a physician recommended by a friend. Injection with procaine hydrochloride into the area, or actual spinal anesthesia, with or without orthopedic manipulation, also may ease his pain for a while; then again the pain recurs. During all this time, a diagnosis may or may not be made. As a rule, each successive practitioner makes a different diagnosis. Finally, someone calls the patient a malingerer, a "goldbricker," or some other such flattering term, saying that there is nothing wrong and that he should resume his regular work. This is usually sufficient to make the average person psychoneurotic.

Surgical Therapy.—A patient who is able to work every day at his normal employment, even though he has pain in his back and in his legs, is usually not a good candidate for operation. Many such patients come into the doctor's office with a great number of complaints but state that they are able to work or that they have "just quit work" the day before. Few such persons are suffering from rupture of an intervertebral disc.

In certain instances in which the clinical diagnosis of ruptured disc is positive and the results of myelographic study definitely negative, exploration should be instituted. This is true particularly in those instances of protrusion at the fifth lumbar and first sacral levels in which the spinal canal ends at the upper edge of the first sacral segment and is very narrow, so that there is plenty of room for the protrusion to occur without interference of the nerve root or the spinal canal at that level. In our experience, a protrusion in this location which produces a normal myelogram is a "rare bird" indeed.

As far as anesthesia is concerned, we have tried all methods—endotracheal, local, spinal. At present we are inclined to use an endotracheal anesthetic, although at Veterans' Hospital we use only spinal, excluding all other anesthetics for this operative procedure.

Operative Technic. — The position of the patient is of some importance in the operative technic, to reduce morbidity and to facilitate the procedure. We place the patient on the operating table with the hips flexed and at an angle of 90 degrees with the rest of the body, and then with the lower limbs flexed on the body and tied to the sides of the table, in tailor fashion. This position was suggested to us by Dr. Howard Black of Sacramento, California, and we have found that in our hands it facilitates the procedure greatly and leads to the minimal postoperative morbidity rate. This relaxes the various roots of the sciatic nerve and makes retraction of the nerve root medially a very easy procedure in most instances. Furthermore, it definitely reduces the amount of weakness of the lateral leg musculature and creates a great deal less hypesthesia and anesthesia.

As to the actual operative procedure, we have used Love's interlaminal approach in 260 of 300 patients, or 86.6 per cent. We performed classic laminectomy on 40 patients, or 13.3 per cent. This we do when the disc is not obvious. In other words, before an exploration for ruptured intervertebral disc can be said to have given a negative result, it is necessary to explore one or more spaces, and then, no disc having been found, a classic laminectomy should be done, with careful preservation of the facets and the bone between these facets. On occasion we have found, after a good wide exposure had been obtained and the roots could be compared as to size and position, that the location of the herniation of the disc was obvious. Many patients have a total rupture of the annulus and the anterior longitudinal ligament, with protrusion of disc

fragments into the spinal canal proper. Many others have disc fragments lying beneath the anterior longitudinal ligament, and these fragments all become apparent after the anterior longitudinal ligament is incised over the fragment.

Of the patients on whom a classic laminectomy was performed, no disc was found in 14. Five were secondary procedures after previous unsuccessful disc operations. A ruptured disc was present in 21 instances. We consider it very important to do certain things in exploration for a disc. After the interlaminal ligament has been removed and a window made, the root must always be identified and retracted medially with a Love retractor. Next, all bleeding must be controlled; we do this by packing small pledgets with strings and by electrocauterization of the venous plexus, which lies on the anterior longitudinal ligament. It has become our practice, when there is any doubt as to whether we have the root retracted (and sometimes this cannot always be determined for sure when one is operating through such a small window as the Love procedure provides), to stimulate by means of electrocautery in the lateral recess of the spinal canal; the jerk of the corresponding musculature will often cause one to advance with caution. Complete curettement of the intervertebral disc space has become our custom. During the first year and a half in which the patients in this series were under observation, we were often content to remove only the protruded disc fragment and go no further. We have concluded that this is a cause of needless secondary operations, and at present our removal of the nuclear fragments is as nearly total as possible. This thorough removal can be done only under direct vision, with good lighting, proper instruments, and a good wide hole in the annulus on the operative side.

Postoperative Treatment.—It has become our custom to get these patients up as early as possible. Apparently there is less postoperative morbidity when early ambulation is practiced, and the element of neurosis is diminished. We get these patients up on the second or third postoperative day, occasionally on the first, and they are usually allowed to leave the hospital on the seventh postoperative day, after the sutures have been removed. Morphine sulfate or Demerol is required during the first and second postoperative days; thereafter, codeine and aspirin and aspirin alone are used. It has been necessary to catheterize 72 of the 300 patients operated on, or 24 per cent. Most of these patients can take a general diet on the first postoperative day.

Secondary Operations.—The secondary operations in this series are summarized in Table 9. There were 23 patients who required two or more operative procedures for ruptured intervertebral discs. Twelve of these were operated on for the first time by one of us (R. D. W.); 11 were operated upon elsewhere. The data on these patients can be narrowed down to the following points: (1) rupture of the intervertebral disc at the same level as before, or, most probably, incomplete removal of nuclear material with secondary protrusion; (2) second herniation at a different level; (3) arachnoiditis, and (4) no cause determined for recurrent complaints. It is the cases of these patients in which the poorest results will ensue, and it is noted that there were 6 patients out of the 23 who showed no improvement whatsoever; in other words, about 25 per cent of the patients on whom secondary laminectomy was performed for ruptured intervertebral disc obtain no improvement whatever in our hands. Of the 17 who did show improvement after a second operation, there is marked morbidity in practically all; there is either some back pain or leg pain. On the whole, however, these patients are improved and able to work and be self-supporting.

In our experience, patients with localized arachnoiditis of the cauda equina secondary to a previous operation for rupture of the intervertebral disc are very difficult to treat. Section of the nerve root, preferably within the dural canal, is the treatment of choice. In 6 of the twenty-

TABLE 9.—*Secondary Operations*

	Total	Relieved of Pain	No Relief of Pain
Authors' cases—12			
1. Second operation, same level	4	4	
2. Second operation, different level	2	2	
3. Arachnoiditis	2	2	
4. No cause found for recurrent complaints	4	3	1
Others—11			
1. Second operation, same level	4	3	1
2. Second operation, different level	4	2	2
3. Arachnoiditis	1		1
4. No cause found for recurrent complaints	2	1	1
Relief from secondary operation totals	23	17	6

TABLE 10.—*Cases in Which No Ruptured Disc was Found at Operation*

	Total	"Negative" Myelogram	"Positive" Myelogram
1. Unknown, no diagnosis made	14	1	13
2. Arachnoiditis	3		3
3. Inflamed nerve roots	2	1	1
4. Hemangioma	1		1
5. Osteoarthritis	3	2	1
6. Ganglioneuroma	1		1
7. Hypertrophy of ligamentum flavum	2		2
Total 26/300			8.6 per cent

three patients, no cause could be found for the recurrent complaints, and of these 6 patients 4 were markedly improved by the secondary procedure. The cause for this is very difficult to state. These persons had had *bona fide* ruptures of the intervertebral disc verified by myelogram and operation, and at secondary operation nothing could be found to account for the recurrent symptoms.

Errors in Diagnosis.—Table 10 summarizes 26 cases in which the diagnosis turned out to be in error. In other words, 26 of 300 patients did not have ruptured intervertebral discs, the percentage being 8.6 per cent. The myelogram indicated the lesion in 22 of these patients and gave negative results in 4. The table is otherwise self-explanatory.

Follow-Up of 143 Patients.—An effort was made to find out how these patients were doing. The following questionnaire was sent to all 300, and 143 replies were received. The patients were asked to rate the result of operation as: (a) cured; (b) improved, some symptoms; (c) unimproved, and (d) worse. They were asked, "Are you working?" and requested to specify (a) same employment; (b) easier employment because of operation; (c) unable to work because of symptoms referable to operation, and (d) unable to work because of another condition. In an effort to determine the amount of morbidity following the operation, the third question was, "Is there pain in the back, pain in the legs, or numbness and paresthesias?"

Tables 11 and 12 summarize the tabulated results as derived from these questionnaires. These have been divided into two groups: There were 85 private patients, and a total of 58 treated in a veterans' hospital.

If we note the 85 private patients first, there were 20, or 23.5 per cent, who stated they were cured; 60 or 23.5 per cent; sixty, or 70.6 per cent were improved; 5, or 5.9 per cent, were unimproved; none were worse.

As to employment in this group of patients, 57, or 67.1 per cent, were able to resume their previous employment; 21, or 24.7 per cent, had to seek easier employment because of their postoperative condition; 6, or 7.1 per cent, are unable to work because of their disc condition; and only 1, or 1.1 per cent, is unable to work because of some other condition.

As to morbidity, 29, or 34.1 per cent, of these patients stated that they still had some back pain; 35, or 41.2 per cent,

TABLE 11.—*Private Patients*

Result of Operation	Number	%
Cured	20	23.5
Improved	60	70.6
Unimproved	5	5.9
Worse	0	
Employment		
Same employment	57	67.1
Easier employment	21	24.7
Unable to work; symptoms referable to operation	6	7.1
Unable to work because of another condition	1	1.1
Morbidity		
Back pain	29	34.1
Leg pain	35	41.2
Numbness	46	54.1

TABLE 12.—*Veteran Patients*

Result of Operation	Number	%
Cured	4	6.9
Improved	42	72.4
Unimproved	8	13.8
Worse	4	6.9
Employment		
Same employment	17	29.3
Easier employment	35	60.3
Unable to work; symptoms referable to operation	4	6.9
Unable to work, because of another condition	2	3.5
Morbidity		
Back pain	33	56.9
Leg pain	32	55.2
Numbness	34	58.6

stated that they had some pain in the legs; and numbness in one leg or the other was complained of by 46, or 54.1 per cent.

In the veterans' group there is some difference. Of these 58 patients, only 4, or 6.9 per cent, stated unequivocally that they were cured; 42, or 72.4 per cent, were improved; 8, or 13.8 per cent, were unimproved, and 4, or 6.9 per cent, stated that they were worse. As to their ability to work, 17, or 29.3 per cent, were able to carry on the same job as before the operation; 35, or 60.3 per cent, had found it necessary to seek easier employment; 4, or 6.9 per cent, were unable to work because of symptoms following the operation, and 2, or 3.5 per cent, were unable to work because of other conditions. As to morbidity, 33, or 56.9 per cent, complained of some back pain; 32, or 55.2 per cent, of some leg pain; and 34, or 58.6 per cent, of some numbness and paresthesias.

COMMENT

These tables bring out some very interesting facts. In the first place, it is worth while to contrast the patient's subjective opinion as to his present condition to his ability to work. Among the private patients, it will be noted that 94 per cent were either improved or cured subjectively and that 91.7 per cent of these patients were able to work. Among the veterans, 79.3 per cent were either cured or improved, while 13.7 per cent are unimproved and 6.8 per cent are worse than before the operation. However, about the same number are able to work—or 89.6 per cent of the veterans' group and 91.7 per cent of the private patients.

Subjectively, about 55 to 60 per cent of the veterans had some morbidity, either numbness or pain in the back or pain in the legs, as compared to private patients (about 35 to 40 per cent complained of pain in the back and legs, about 54 per cent of numbness).

These figures are easy to explain when one considers that a goodly number of the veteran patients receive compensation from the government and quite possibly feel that the present questionnaire might have something to do with the status as beneficiaries.

This study has brought out some very important points. Myelographic study yields close to 90 per cent accuracy in the hands of the radiologist. It is most important to reduce the number of secondary operations for ruptured intervertebral disc. As is pointed out in Table 9, when a patient undergoes a secondary operation for a ruptured intervertebral disc, he stands a 25 per cent chance of getting no relief from his pain. Thus, in our opinion, it is extremely important to cut down the number of secondary operations. This can best be avoided, we are convinced, by doing myelographic investigations in all cases in which the presence of a ruptured disc is suspected. This will cut down the number of patients who have multiple disc ruptures and will leave this factor less to the judgment of the sur-

geon. It limits the degree and extent of exploration necessary and should result in satisfaction to more of the patients.

These figures call for a continuation of a conservative approach to surgical treatment of ruptured discs. Any major operative procedure that leaves from 6 to 20 per cent of patients unimproved requires improvement. Such improvements can be brought about only by using every diagnostic aid to cut down the number of multiple operations, multiple space explorations, and secondary operations.

SUMMARY

This paper summarizes the data concerning 300 operations for rupture of the intervertebral disc. The paper takes up the type of patient, the etiologic factors, the history, the physical signs, the accuracy of myelographic studies, operative procedure, secondary operations, and follow-up results on 150 patients treated for periods varying from one to five years.

RÉSUMÉ

Ce travail résume les données concernant 300 cas d'opération pour rupture du disque intervertébral. On relève le mode de pathologie, les facteurs étiologiques, l'histoire de cas du patient, les signes physiques, les procédés opératoires, les opérations secondaires et les suites opératoires sur 150 patients traités sur une période variant de l à 5 ans.

RIASSUNTO

Nell'articolo sono riassunti i dati relativi a 300 interventin per rottura del disco intervertebrale, e precisamente il tipo dei malati, i fattori etiologici, la storia, i segni fisici, gli studi mielografica, i metodi operatori, gli interventi secondari e i risultati a distanza di 150 pazienti curati in periodi vari da 1 a 5 anni.

ZUSAMMENFASSUNG

In der Arbeit werden die Daten von 300 wegen Zwischenwirbelscheibenrisses vorgenommenen Operationen zusammengefasst. Der Typus des Kranken, die ursaechlichen Faktoren, die Krankheitsgeschichte, die Krankheitszeichen, die Zuverlaessigkeit myelographischer Untersuchungen, das chirurgische Verfahren, Nachoperationen und die Ergebnisse in 150 Faellen, deren Behandlungszeiten zwichen 1 und 5 Jahren schwankten, werden besprochen.

RESUMEN

Se resumen los datos de 300 operaciones por ruptura del disco intervertebral. Se consignan tipo de paciente, factores etiológicos, antecedentes, signos físicos, exactitud de estudios mielográficos, procedimiento operatorio, operaciones secundarias y resultados subsiguientes en 150 pacientes tratados por períodos de uno a cinco años.

SUMARIO

Este trabalho é um resumo dos dados relativos a 300 operações por rotura do disco intervertebral. O estudo considéra o tipo do paciente, os fatôres etiologicos, a historia, os sinais fisicos, a precisão dos exames mielograficos, o processo operatorio, as operações secundarias e os resultados posoperatorios de 150 pacientes tratados em periodos de um a cinco anos.

Some Principles of Pancreatic Surgery

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WE are presenting a triad of cases exemplifying conditions encountered in pancreatic surgical practice. They demonstrate certain general principles that have been clarified for us.

A great stimulus was given pancreatic surgery in 1935, when Whipple[1] first established a sound technic for approaching carcinoma of the pancreatic head. Many clinics have since contributed a great deal to the solution of all problems involving the pancreas, and the diversity of ideas and procedures found in the literature emphasizes the progress that is being made. Already surgeons have succeeded in lowering the mortality rate, which formerly was so discouraging. Much more time, study and experience will be required, however, before the final effectiveness of these methods may be evaluated. During this period, our surgical thought should naturally crystallize along proved channels.

It is not within the scope of this paper, nor is it our purpose here, to present problems of diagnosis or symptomatology, but rather to show what we consider fundamental principles and how each case must be handled individually, with these in mind.

Our first case highlights beautifully several of these ideas and principles, which we have come to believe are mandatory.

CASE 1.—A man aged 68, slightly jaundiced, had foul diarrhea and had lost weight. Roentgen examination suggested abnormality of the duodenum, and tests proved that jaundice of the obstructive type was present. At operation the common bile duct proved to be many times the normal size. The duodenum, when opened, showed a fungating carcinoma of the ampulla of Vater, 3 to 4 cm. in diameter. A wide excision was done. The common bile duct and the pancreatic duct were sutured to form a new opening into the duodenal mucosa. A large T-tube drained the common duct and extended into the duodenum.

The patient's recovery in the hospital was satisfactory. After five months, however, there was no gain in weight, the stools were the same as before the operation, and a roentgenogram demonstrated a marked reflux of ingested material into both the main biliary and pancreatic ducts and their radicles (Fig. 1).

The obvious method of correction seemed to us to be interruption of the gastric stream over this area by means of a subtotal gastrectomy. Since this procedure the patient has improved and gained weight. The bowel movements have returned to normal. We were pleased, at the time of the second operation, to note there was no evident recurrence of the original growth.

This case indicated to us that successful removal of the primary pathologic lesion (cancer of ampulla) alone did not relieve the patient of his presenting symptoms, because irritation by the reflux material propagated the pancreatitis.

In our opinion, when the sphincter of Oddi is to be sacrificed, diversion of intestinal contents is needed to reestablish normal physiologic conditions. Mallet-Guy and his associates[2] have done many cholangiographic studies confirming this thought. A similar situation may arise when the sphincter is damaged by forceful dilatation or sphincterectomy and later requires diversion by subtotal gastrectomy.

CASE 2.—A white man aged 73 was admitted with diagnosis of intestinal obstruction. He had lost a great deal of weight and suffered constipation alternating with foul diarrhea. A flat roentgenogram of the abdo-

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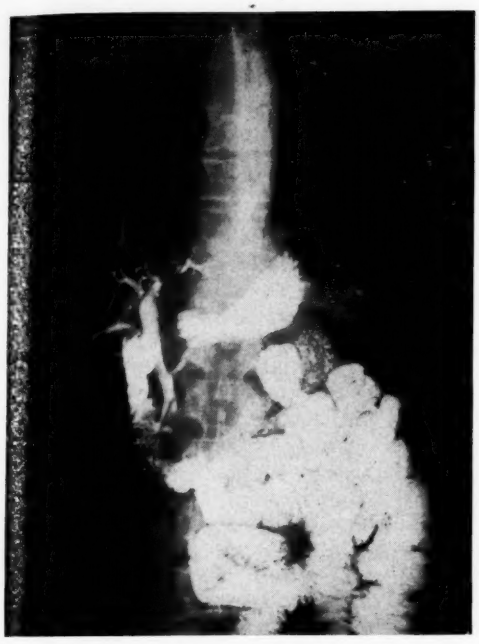

Fig. 1 (Case 1).—Barium reflux into biliary and pancreatic ducts.

men showed no typical gas pattern. However, a calcified area in the region of the head of the pancreas was misinterpreted as a calcified lymph node (Fig. 2). At operation this was identified as a calculus in the duct of Wirsung. The head of the pancreas was rotated, the duodenum opened and with the pancreatic duct between two fingers, careful exploration was done and the calculus removed. To maintain drainage and dilatation, a rubber tube about 6 cm. long was loosely sutured in place, splinting the opened duct and extending through the sphincter. At the time of operation the patient weighed 96 pounds (43.5 Kg.). He rapidly regained weight to his normal level of 140 pounds (64 Kg.). About two months after he left the hospital he had a mild vomiting spell and was somewhat amazed when he produced the small rubber tube.

This case, of course, illustrates obstruction of the pancreatic duct with its usual symptoms. Relief of obstruction by removal of the calculus, without extensive damage to the sphincter, apparently brought about complete cure. Again, we would caution against sphincterectomy and emphasize the fact that much can be done in a delicate and careful manner without permanently harming the sphincter.

CASE 3.—A man aged 32 was admitted with a diagnosis of acute appendicitis. At operation acute hemorrhagic pancreatitis was present, with cholelithiasis. The gallbladder was drained. Two and a half years later the gastrointestinal symptoms gradually became worse, and roentgen study showed the presence of a large mass (Fig. 3) immediately posterior to the pyloric end of the stomach. When laparotomy was done at this time, the mass was identified as a cyst 6 to 7 cm. in diameter. It was opened through the posterior wall of the stomach, the maneuver forming a large stoma. Gastric resection above this level was then done.

The question of interruption of the gastric stream over this large defect was clearly settled. Cattell and Warren[3*] have even cited a similar case in which ulceration formed on the rim of the opening.

Four months after this cyst was drained

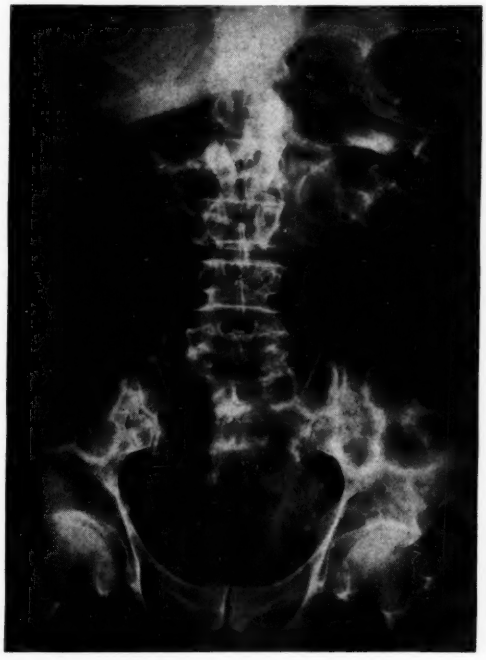

Fig. 2 (Case 2).—Calculus in head of pancreas.

Fig. 3 (Case 3).—Pseudocyst of pancreas.

the patient began to have recurrent pain in the upper part of the abdomen. Studies in the hospital showed low grade jaundice and malfunction of the gallbladder. The upper part of the abdomen was again explored. The pancreatic cyst had completely disappeared. The gallbladder showed definite acute and subacute inflammation, and there was diffuse, firm pancreatic swelling. Exploration of the common duct revealed a pronounced stricture of the ampulla, which was dilated with bougies and splinted with a long-armed T tube. At the time of writing, recovery seems complete.

This case reemphasizes the importance of sphincter disease and back pressure as an etiologic factor in pancreatitis, and also that concurrent cholecystitis must be completely dealt with.

The fundamental concepts of the treatment of pancreatic disease may be classified as follows: The increased intraductal pressure is associated with, and usually caused by, disease of the biliary tract. Rupture of the finer ducts and tributaries occurs, causing interstitial pancreatitis. There are changes in the islets of Langerhans. The further extravasations of enzymatic substances into parenchyma result in hemorrhagic pancreatitis. Stasis within the ducts results in formation of calculi. Prevention of reflux of either duodenal contents or bile into the pancreatic ducts is the first aim of treatment.

Use of the long-limbed T-tube has been advocated by Priestly[4] as one method of reducing intraductal pressure. He also mentioned gastric resection, with or without vagotomy, as an indirect means of reducing pancreatic secretion. It has been our conviction that the continuity of the vagus nerves is always destroyed anyway by doing a transection of the stomach. Cattell and Warren,[3] in their comprehensive survey of this whole subject, reviewed the numerous methods of attack both direct and indirect.

This study, however, of the cases of pancreatitis that we have encountered leads us to agree wtih Richmond and Colp,[5] who likewise presented a valuable and inspiring report on the use of gastrectomy in the treatment of severe pancreatitis. The careful interpretation and evaluation of the individual case is necessary, but gastrectomy has, in our opinion, become a safe and valuable procedure to employ for relief from a serious and complicated disorder.

In conclusion, pancreatic disease is sufficiently frequent to be considered in the differential diagnosis by the internist and surgeon. Prompt, early and definitive treatment will greatly improve results. To quote Gambill,[6] "To observe the patient for weeks, until a diagnosis is obvious, is to study the patient to death."

SUMMARY

Three types of cases of pancreatic disease are presented to illustrate the principles of surgical treatment. A case of cancer of the ampulla of Vater is cited, in which excision of the growth resulted in duodenal and biliary reflux into the pancreatic ducts, making gastrectomy mandatory. The second case was one of pancreatic lithiasis; the stone was removed without serious damage to the

sphincter of Oddi and with complete recovery. In the third case a pseudocyst of the pancreas was present, with drainage into the pyloric end of stomach and gastrectomy. Later it was necessary to remove the gallbladder and drain the common duct. In the author's opinion, the important factors in treatment of pancreatic disease are the integrity of the sphincter of Oddi and the elimination of biliary disease, which is usually the cause. After anatomic damage has been done, gastrectomy is of great value in restoring normal function.

RESUMEN

Se presentan tres tipos de casos de enfermedad pancreática, para ilustrar los principios del tratamiento quirúrgico. Se cita un caso de cáncer de la ampolla de Vater, en el que la excisión dió por resultado el reflujo duodenal y biliar a los conductos pancreáticos, haciendo imperativa la gastrectomía. En otro caso se trató de litiasis pancreática, habiéndose extraído el cálculo sin daño de importancia para el esfínter de Oddi y con recuperación completa. El caso restante era de un pseudoquiste pancreático, habiéndose canalizado a la terminación pilórica del estómago y hecho gastrectomía, siendo necesario posteriormente colecistectomía y canalización del colédoco. Se estima que los factores importantes en el tratamiento de enfermedad pancreática son la integridad del esfínter de Oddi y la eliminación de enfermedad biliar, que es ordinariamente la causa. La gastrectomía es de gran valor para restaurar la función normal en caso de daño anatómico.

SUMARIO

Tres tipos de casos de doença pancreatica são apresentados prar ilustrar os principios do tratamento cirurgico. Um caso de cancer da ampola de Vater é citado, no qual a excisão do tumor resultou em refluxo duodenal a biliar dentro dos canais pancreaticos obregando a gastrectomia. O segundo caso foi um de litiase pancreatica; o calculo foi removido sem serio dans ao esfincter de Oddi e com restabelecimento completo do enfermo. No terceiro caso um pseudocisto do pancreas estava presente com drenagem dentro da parte pilorica do estomago e gastrectomia. Posteriormente foi necessario remover a vesicula biliar e drenar o coledoco. Na opinião do autor os fatores importantes no tratamento da doença pancreatica são e integridade do esfincter de Oddi e a eliminação de doença biliar, a qual é usualmente a causa. Depois que o dano anatomico esta feito, a gastrectomia é de grande valor para restaurar a função normal.

RÉSUMÉ

Trois variétés de maladies du pancréas sont présentées afin d'en examiner les traitementes. Un cas de cancer de l'ampoule de Vater a été excisé; un cas de lithiase pancréatique où le calcul a été enlevé sans complication. Le 3e cas, un pseudo-kyste du pancréas avec drainage de la partie duodénale de l'estomac et gastrectomie. Cependant, il a fallu plus tard enlever la vésicule et drainer le cholédoque. Une condition essentielle de succès est d'après l'auteur, l'intégrité du sphincter d'Oddi et l'élimination de lésions biliaires. Ceci fait, la gastrectomie s'avère avantageuse.

RIASSUNTO

Vengono presentati 3 casi di malattia pancreatica per illustrare i canoni della terapia chirurgica di questa affezione. Nel primo malato vi era un cancro dell'ampolla di Vater e la asportazione del tumore condusse a un reflusso duodenale e biliare nel dotto pancreatico, così da imporre la gastrectomia. Nel secondo caso vi era una litiasi pancreatica; il calcolo fu estratto senza gravi lesioni dello sfintere di Oddi e vi fu guarigione completa. Nel terzo caso vi era una pseudocisti del pancreas drenata nell'estremo distale dello stomaco e gastrectomia. In seguito fu necessario togliere la colecisti e drenare il coledoco.

Nel concetto dell'Autore la cosa più importante nella cura delle malattie pancreatiche è rappresentata dall'integrità dello sfintere di Oddi e dalla eliminazione della malattia biliare che di solito ne è la causa. Prodotto un danno anatomico, la gastrectomia è molto utile per ripristinare le funzioni normali.

ZUSAMMENFASSUNG

Es werden drei Arten von Bauchspeicheldruesenerkrankungen dargestellt, um die Grundlagen der chirurgischen Behandlung zu erlaeutern. Im ersten Falle handelt es sich um einen Krebs der Vaterschen Ampulle, wo die Resektion der Geschwulst zu einem Rueckfluss des Duodenalsaftes und der Galle in die Pankreasgaenge fuehrte und eine Magenresektion noetig wurde. Der zweite Fall bezieht sich auf einen Pankreasstein, der ohne ernste Schaedigung des Sphincter Oddi entfernt surde; es trat voellige Heilung ein. Im dritten Fall lag eine Pseudozyste der Bauchspeicheldruese mit Drainierung in den Pylorusteil des Magens und Magenresektion vor. Spaeter wurde es notwendig, die Gallenblase zu resezieren und den Choledochus zu drainieren. Der Verfasser ist der Meinung, dass der wesentliche Punkt in der Behandlung von Bauchspeicheldruesenerkrankungen in der Erhaltung des Sphincter Oddi und in der Beseitigung der biliaeren Erkrankung, die gewoehnlich die Ursache darstellt, liegt. Wenn es zu einer anatomischen Schaedigung kommt, ist die Magenresektion fuer die Wiederherstellung normaler Funktion von grossem Wert.

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The Enigma of Retroperitoneal Masses

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A RETROPERITONEAL mass is infrequently encountered, but when observed it usually presents a major diagnostic problem. Early recognition is difficult, since neighboring anatomic structures interfere with palpation of small lesions, and the symptoms of most retroperitoneal masses are so insidious that the patients are often not aware of their presence. Even when the existence of a mass is established, the preoperative determination of the organ involved and the differentiation of the type of pathologic change present is a challenge to the surgeon. Most retroperitoneal lesions are observed at autopsy, and in at least half of the remainder the pathologic nature of the condition is determined only by surgical exploration.

This paper is primarily concerned with the presentation of problems in the differential diagnosis of a diversified group of retroperitoneal masses. We hope that the review of typical case histories and the evaluation of investigative methods will aid in the earlier and more accurate diagnosis of pathologic conditions in the retroperitoneal space.

A systematized diagnostic approach is important for the successful management of retroperitoneal masses. The first step is to identify the guilty organ and then the pathologic change in that organ. This requires a working knowledge not only of the investigative procedures used in surgical practice but those of other specialties. Many of the diagnostic technics of the endocrinologist, the hematologist, the urologist, the gynecologist and the roentgenologist may have to be used to arrive at a diagnosis. Failure to use these tools efficiently increases the percentage of exploratory procedures.

Diagnostic studies of retroperitoneal tumors call for the usual careful history, physical examination and laboratory tests. The symptoms associated with retroperitoneal pathologic change depend on the organs involved, the age and sex of the patient, the location and size of the mass, the degree of its malignancy and the type of its endocrine activity. All these factors make it difficult to describe syndromes for clinical purposes.

Roentgenographic studies of the gastrointestinal and genitourinary tracts are indicated in practically every case. Since renal tumors are much more frequent in the retroperitoneal space than are nonrenal growths, careful pyelographic study will aid in the differentiation and localization of the growth. It is important to know the functional status of both kidneys, since unilateral nephrectomy may be required even when renal involvement is unsuspected. An attempt should be made to determine which viscera are distorted or displaced and whether there is intrinsic or extrinsic disease in the organs examined. The movability or immovability of an organ or mass can sometimes be easily demonstrated roentgenographically, a maneuver often neglected. A combination of procedures is extremely valuable. For example, visualization of the gastrointestinal tract at the same time pyelographic studies are made will sometimes add more diagnostic information than will either study alone. The use of oblique and lateral views with these combined studies help in localization of the lesion.

Special roentgenographic technics are indicated for specific purposes.

Uterotubographic study is of value

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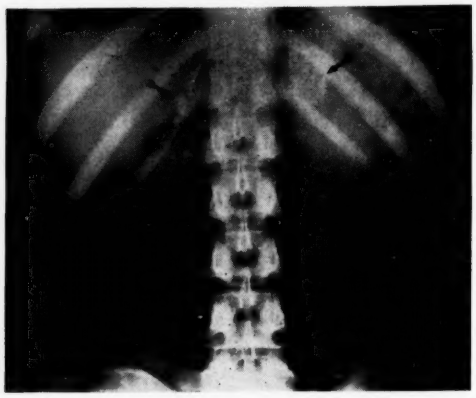

Fig. 1.—Woman aged 20. Calcification of the adrenals, discovered incidentally. Note the positions and the differences in size and shape of the glands.

with the female patient, to visualize the pelvic organs and their relation to the retroperitoneal mass.

Retroperitoneal pneumographic study is performed by the injection of a gas into the retroperitoneal areolar tissues as a contrast medium for roentgen visualization of the anatomic structures. It makes possible the outlining of the adrenal glands, the kidneys and some of the retroperitoneal soft parts, and the demonstration of abnormal retroperitoneal masses. Direct perirenal insufflation was introduced by Carelli in 1921 as a method of delineating the kidney from the surrounding tissues. Cahill in 1935 reported its value in the diagnosis of hypertrophy and new growths of the adrenals. Wilhelm in 1943 recommended the use of a laminographic technic in the adrenal area after injection of gases into the perirenal space for superior visualization. Rivas in 1950 devised an indirect method of retroperitoneal pneumographic study by a single injection of gas into the retrorectal areolar tissue. He chose this area because of its accessibility and the absence of large vessels and vital organs. The gas surrounds the rectum, extends into the cellular tissues of the uterus and its adnexa, and is diffused around the kidneys and adrenals on both sides. On a recent visit to Spain, Rivas showed one of us (M.L.B.) the roentgenograms of women in whose cases he had done uterotubographic and retroperitoneal pneumographic studies at the same time. The results were startling, since the interior and the exterior of the pelvic organs were visualized simultaneously. This procedure appears to be simple, safe and nonpainful. It merits wider application.

Arteriographic study, the roentgen delineation of the aorta and its branches by translumbar injection of a radiopaque medium, has been employed by Doss to determine the relation of a retroperitoneal tumor to the kidney and to diagnose splenic tumors. An important and difficult diagnostic problem arising in the presence of many retroperitoneal masses is to distinguish cyst from tumor. It is probable that in a certain number of cases arteriographic studies may help in this differentiation. The reports of Doss and others on the value of this procedure are encouraging, and further trial is indicated.

Diagnostic puncture of a retroperitoneal mass may be done, but the value of this procedure is questionable, and the procedure itself is not without danger.

Peritoneoscopic investigation, properly applied in selected cases, is of value in visualizing the interior of the abdominal cavity and in determining the intraabdominal or retroperitoneal status of a mass. In a female patient, it is often possible to identify the pelvic origin of a mass.

The information secured by endoscopic or roentgenographic study of a retroperitoneal mass is only an adjunct to the data obtained by other methods of investigation. There are a number of special examinations that are very valuable for selected purposes. Many chemical and biochemical procedures, when properly interpreted, will help to localize a growth and even to determine its pathologic character. Estrogenic assay and determination of the value for 17-ketosteroid excretion will reveal the hormonal character and the cortical origin of an adrenal tumor. The

pharmacologic effect of certain drugs on the blood pressure can be utilized to diagnose a chromaffin cell tumor. Studies of the blood will aid in recognition of tumors due to myeloid or leukemic or lymphatic infiltration.

Retroperitoneal masses may originate from three organs, the adrenal, the kidney, and the genital organ; and two anatomic structures, the walls forming the retroperitoneal cavity and the unattached tissues within the retroperitoneal space.

1. *Adrenal Tumors.*—Connective tissue and vascular tumors of the adrenal glands, such as fibroma, neurofibroma, myoma, hemangioma and lymphangioma, are rare, and no distinct clinical picture has been recognized. The corticoadrenal tumors are of particular interest because they are so often associated with the adrenogenital syndrome. Clinically their manifestation is characterized by dysfunction of the secondary sex characteristics, metabolic disturbances and prematurity.

The adrenal medullary tumors, especially the pheocromocytoma, arising from the chromaffin tissue and the paraganglioma of the adjacent sympathetic chain, produce characteristic symptoms consisting of paroxysmal hypertension, vasomotor disturbances and glycosuria.

The roentgenologic problem in the diagnosis of adrenal tumors is to establish the presence of an adrenal gland that is abnormal in size, shape or position. This is often difficult, since there appears normally to be a marked variation in these factors. It must also be remembered that some of the most active functioning tumors are small and do not displace the kidney or distort the adrenal outline. It is impossible to determine from the roentgenogram whether the adrenal tumor arises from the cortex or from the medulla. An instance of calcification of the adrenal gland is shown to illustrate

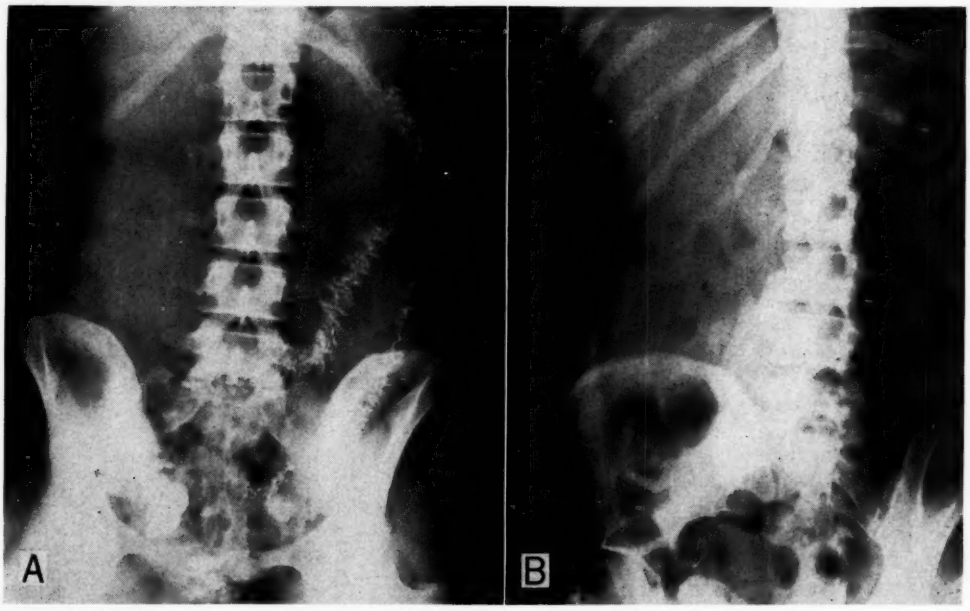

Fig. 2.—Case of L. S., aged 41. *A*, virilizing tumor of adrenal (barium enema). The entire region is well outlined. The hepatic flexure is displaced by a large mass in the right upper quadrant. *B*, intravenous pyelogram, left oblique view. The right kidney is displaced downward and its pelvis lies to the left of the midline, at the level of the left lateral border of the third lumbar vertebra. The renal pelvis is compressed and rotated by a retroperitoneal mass.

the approximate size, shape and position of the adrenals (Fig. 1).

The following case presents some of the problems encountered in the management of an adrenal tumor.

L. S., a woman aged 41, was admitted to the hospital complaining of abdominal pain for the past three months, amenorrhea of two years' duration, and hirsutism. A large ovarian cyst had been removed twenty-two years earlier. The patient was married and had 1 child, aged 17. Pelvic examination gave essentially negative results except for a suprapubic scar and marked hypertrophy of the clitoris. Abdominal examination revealed a mass the size of a grapefruit in the right upper quadrant. The blood pressure in millimeters of mercury was 110 systolic and 60 drastolic. The value for 17, ketosteroids was 115 (normal range 8 to 12). A barium enema (Fig. 2*A*) showed the hepatic flexure depressed by a large mass. An intravenous pyelogram (Fig. 2*B*) showed the left kidney to be normal. The right kidney was displaced medially, and the right pelvis lay to the left of the midline at the level of the left lateral border of the third lumbar vertebrae. The patient was operated upon for a right adrenal cortico-genital tumor through a horizontal incision extending from the midline of the anterior abdominal wall to the midline of the vertebrae. The twelfth rib was removed. The retroperitoneal space was opened, and a mass 6 by 9 inches (15.2 by 22.8 cm.) in diameter was present and so densely adherent to the right kidney that the latter had to be removed with the tumor mass. The patient withstood the operation very well, the blood pressure remaining at about 12 degrees and the pulse rate around 90. The pathologic diagnosis was benign adrenal cortical adenoma benign, clinically virilizing.

2. *The Retroperitoneal Mass of Renal Origin.*—Renal tumors far outnumber all other retroperitoneal masses. It is beyond the scope of this report to discuss the differential diagnosis of the usual renal tumors, such as hypernephroma, solitary cyst, etc., except to state that a complete urologic study is indicated in each case. However, there are tumors, such as lipoma, myxoma, fibrolipoma, sarcoma, etc., that originate from the renal capsule and that must be occasionally considered.

The tumor in the following case, aris-

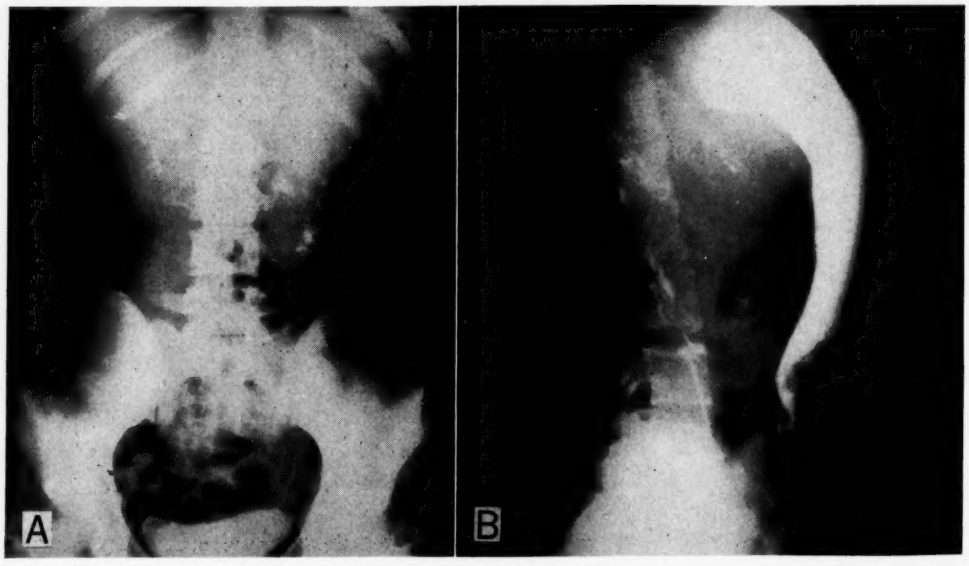

Fig. 3 (case of C. C.).—*A*, intravenous pyelogram. The left kidney has the appearance of a polycystic organ. *B*, intravenous pyelogram taken after the patient had swallowed an opaque medium and a lateral view was taken. The position of the growth appears to be anterior to the kidney and posterior to the stomach. The possibility of a tumor of the pancreas was considered.

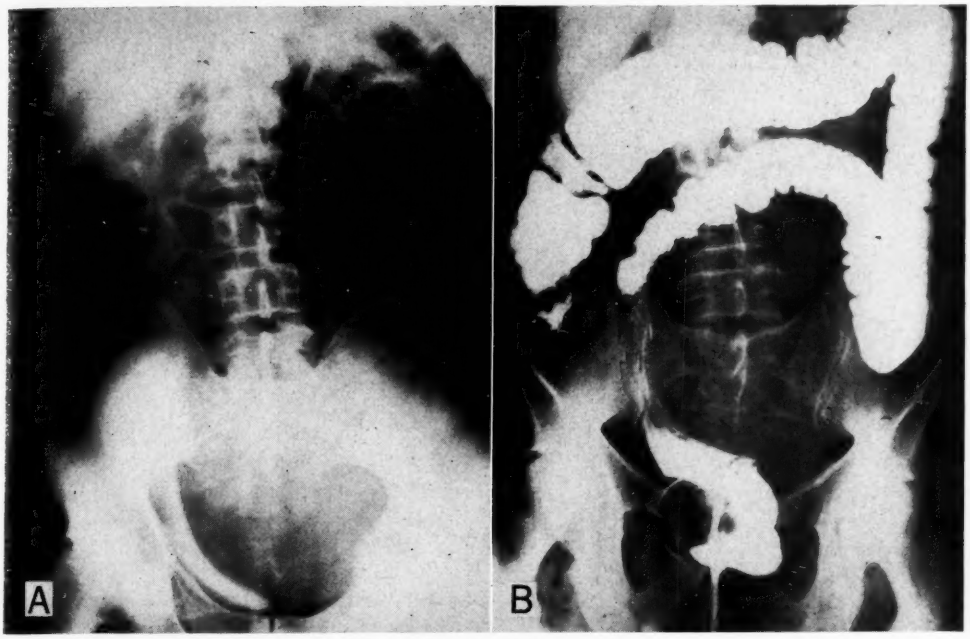

Fig. 4.—Case of J. M., a man aged 44, with retroperitoneal cyst. *A*, cystogram taken after an intravenous pyelogram, showing the bladder displaced to the right and markedly compressed so as to be curved and elongated out of the bony pelvis. *B*, barium enema showed no evidence of intrinsic destructive or obstructive lesions. The rectum and sigmoid are compressed and displaced posteriorly and to the right; and the sigmoid is displaced upward by a large mass. The colon emptied well after evacuation.

ing from the anterior aspect of the kidney, simulated cysts on the intravenous pyelogram (Fig. 3*A*) to such an extent that a preoperative diagnosis of polycystic kidneys was made. The roentgenologist, after a gastrointestinal series combined with an intravenous pyelogram (Fig. 3*B*), considered the possibility of a pancreatic tumor.

C. C., aged 17, was admitted to the hospital with a history of two episodes of hematuria and sputum that gave positive results for tuberculosis. The spleen and liver were enlarged, and a mass was palpated in the abdomen, on the left side. An exploration was performed through an abdominal incision, and a tumor was observed behind the stomach and pancreas. This mass, which was adherent to surrounding organs and involved the kidney, was removed. On section it contained a soft yellow tumor, which was under the renal capsule and which invaded the kidney anteriorly, but not the calyces. The pathologic diagnosis was spindle cell sarcoma, possibly liposarcoma, originating from the fat of the renal capsule.

3. *Retroperitoneal Masses of Pelvic Origin.*—Various tumors of the pelvic organs are in the retroperitoneal space and may extend upward even as high as the kidneys. However, many growths originate in the pelvis from remnants of the complicated embrologic development of the genitourinary system. These tumors are often calcified and are more common in women than in men. In the following case the patient was male.

J. M., a man aged 44, had no complaints. He went for a routine physical examination, and his physician observed in the midline a large fluctuant suprapubic mass, which was nontender and produced a desire to void on manual pressure. The white blood cell count was 11,000 per cubic millimeter. The value for nonprotein nitrogen was 36 mg. per hundred cubic centimeters. The urine showed a large

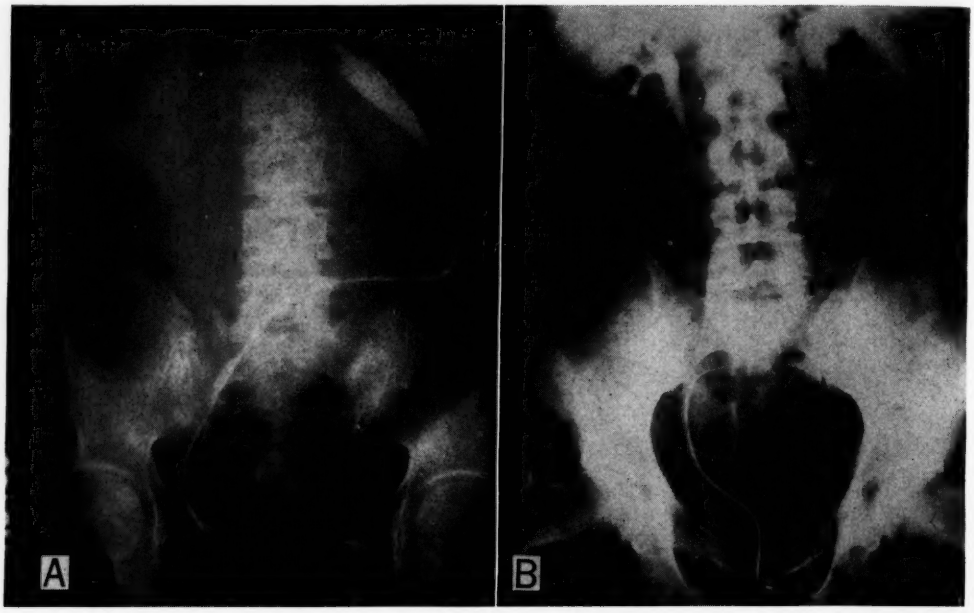

Fig. 5.—*A*, right retrograde pyelogram in the case of C. S., a woman aged 60. The right kidney and ureter are displaced to the left side by a retroperitoneal mass. The right renal pelvis is compressed, elongated and rotated. *B*, retrograde pyelogram of a man aged 57, with retroperitoneal myxosarcoma. There is a bulge of the right psoas muscle, and some medical displacement of the middle third of the ureter.

trace of albumin, and the sedement contained 2 to 4 leukocytes (with an occasional clump) and 6 to 8 erythrocytes per high power field, as well as a few fine granular and hyaline casts. An intravenous pyelogram (Fig. 4*A*) revealed a large pelvic mass displacing the bladder to the right lateral gutter of the bony pelvis, compressing it markedly, so that it appeared like a narrow curvilinear tube. It was impossible to determine from the barium enema (Fig. 4*B*) whether the mass was intra-abdominal or retroperitoneal. The normal appearance of the sacrum was against the diagnosis of chordoma. An attempt at cystoscopy was only partially successful. The right ureter was catheterized with some difficulty, but the left ureteral orifice could not be seen. A retroperitoneal cyst was removed through a midline incision. It was a translucent cystic structure measuring 12 by 15 cm. The pathologic diagnosis was "fibrous cystic wall."

4. *Retroperitoneal Masses of Parietal Origin.*—Parietal tumors may arise from the tissues forming the boundaries of the retroperitoneal space and may involve the perirenal area. These growths arise from connective, lymph, muscle or fat tissue, and their origin cannot be determined clinically or roentgenologically. Often the pathologist has difficulty in determining the type of tissue from the histologic picture.

Farbman, in a comprehensive review of approximately 300 retroperitoneal fatty tumors as reported in the literature, made the observation that retroperitoneal fatty tumors occurred in the ratio of 4 female to 1 male patient in cases of benign tumor, and in the ratio of 1 to 1 in cases of malignant lipoma. He was unable to explain the greater disposition to malignancy in the male. He also noted that there were sarcomatous changes in 47 per cent of 53 cases reported in the literature from 1937 to 1947. Approximately 35 per cent of retroperitoneal lipomas are perirenal lipomas that have enlarged so as to fill the retroperitoneal space.

In the following case a benign lesion was present.

C. S., a woman aged 60, entered the hospital with a history of abdominal heaviness for one year and alternating diarrhea and constipation for four months. Examination revealed a grapefruit-sized, freely movable, nontender mass. All the laboratory tests gave normal results. A retrograde pyelogram. (Fig. 5*A*) showed a large mass in the right upper abdominal quadrant, displacing the right kidney to the left upper quadrant. Studies of the gallbladder showed that the mass was not connected to the gall bladder or liver. At operation a soft retroperitoneal mass, the size of a watermelon and weighing 10 pounds (4.5 Kg.) was removed. It was so closely adherent to the kidney that a nephrectomy was done. The pathologic diagnosis was myxolipoma. The patient was recently reported living and well.

Greene has reported 3 cases in which a retroperitoneal mass had displaced the kidney to the opposite side of the abdomen. The kidneys appeared superimposed on the pyelogram. These tumors, similar to the one in this case, were benign. Greene noted on follow-up urographic study that in each case the kidney eventually returned to its own side even though no attempt was made at the time of operation to replace the kidney in normal position.

In the following case the tumor originated from the psoas muscle and was malignant.

C. G., a man aged 57, had a history of a recurrent epigastric pain and pain in the right lower quadrant of the abdomen, diarrhea, and abdominal distention of nine years' duration, becoming more acute in the three days before entry into the hospital. The abdomen was slightly tender and rigid, but no masses were palpable. Gastrointestinal examination and a barium enema gave negative results. An intravenous pyelogram (Fig. 5*B*) showed a bulge of the right psoas. At surgical exploration an orange-shaped lobulated mass was observed on the right psoas muscle and was shelled out of an adematous capsule. The pathologic diagnosis was myxosarcoma.

5. *Free Retroperitoneal Masses.* — These masses are of three types: (a) solid, (b) cystic and (c) free fluid.

J. F., a man aged 33, entered the hospital complaining of diarrhea of eighteen months' duration. All studies gave negative results except the roentgen examination (Fig. 6*A*). It was thought that the mass was a calcified

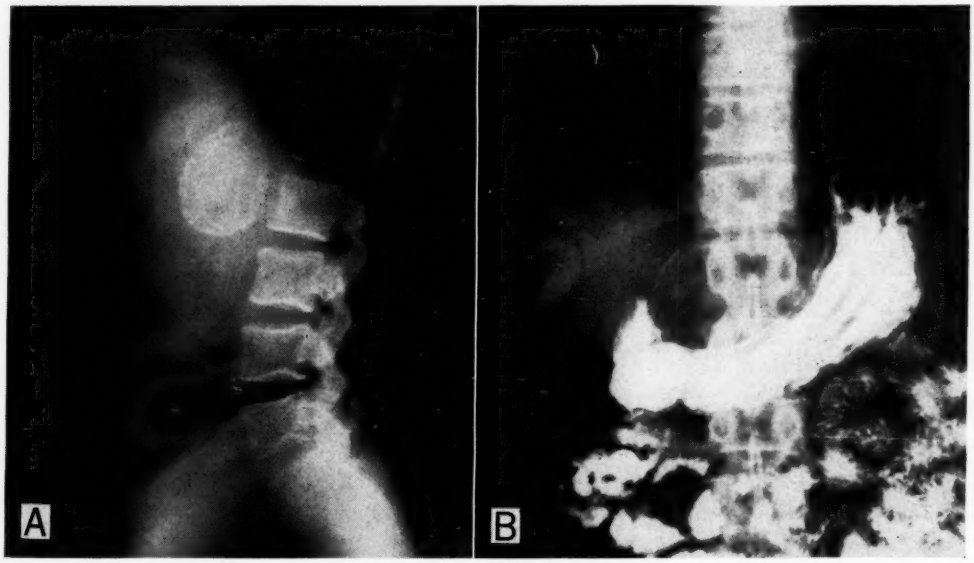

Fig. 6.—Case of J. F., a man aged 33. *A*, lateral roentgenogram showing the retroperitoneal position of the calcified mass. *B*, note the relationship of the calcified mass to the stomach.

cyst in the left lobe of the liver (Fig. 6*B*). At operation the mass was observed to lie behind the pancreas and away from the liver. It was adherent but did not involve the right kidney and adrenal, and was easily enucleated from its bed with no bleeding. The tumor was egg-shaped, measuring 6 cm. in length and from 2 to 4.5 cm. in width. It contained inspissated materials which on microscopic examination revealed necrotic tissue, cholesterol crystals and hemiteric crystals. The pathologic diagnosis was sarcoid in lymph node with capsular calcification.

Cystic Type. — Most retroperitoneal cysts arise from nests of the wolffian or müllerian ducts and are sometimes confused with the chylous cysts that arise from the primitive abdominal lymphatic sac of the fetus. These cysts are often not suspected and are discovered incidentally when the abdomen is opened for another condition.

I. B., a woman aged 24, had a lifetime history of intermittent pain in the right lower abdominal quadrant, with nausea and diarrhea. The symptoms increased in severity after the birth of a child. Examination revealed a firm, sausage-shaped, tender, movable mass in the right lower quadrant, not connected to any organ. Intravenous pyelographic studies showed a normal urinary tract. A barium enema (Fig. 7) was done. An unattached retroperitoneal cyst the size of a large grapefruit was surgically removed. The pathologic diagnosis was cyst of the wolffian duct.

Fig. 7.—Case of I. B., a woman aged 24. The barium enema revealed a soft tissue mass lateral to and posterior to the mid-ascending colon. It appeared to be free of the liver, kidney or colon.

Fig. 8.—Case of S. G., a man aged 67. Retroperitoneal abscess. Intravenous pyelogram. Both kidney outlines are visible. The right is normal in contour and position. The left is globular and displaced upward, rather dense. There is barium retained in the appendix and in several signmoid diverticula. There is a large rounded mass with fairly circumscribed borders in the left side of the abdomen, extending from the lateral gutter to beyond the midline, with the upper limits at about the fifth lumbar level. The lower limits are ill defined. The left kidney is pushed upward by the previously described mass and the lower calyces are compressed and not well outlined. The ureter is displaced medially. The bladder is well filled. The base is considerably elevated. The mass obliterated the left psoas shadow.

Free Fluid Type.—Free fluid in the retroperitoneal space may be blood, pus or urine and may produce a mass that simulates a tumor. Such a mass sometimes follows trauma to the renal pelvis and the ureter, or it may be hematogenous. The pyelogram may show renal compression and deformity and lateral or mesial displacement of the kidney. Antibiotics have changed the clinical picture usually asso-

ciated with these conditions. Fever is often minimal or absent, and urinary symptoms are not prominent. The following case is an example.

S. G., a man aged 67, three years before admission noticed a severe pain in the left leg and was rushed to a hospital, where the left internal iliac vein was ligated. Since this event marked varicosities had developed in the left leg, which swelled intermittently. One week before admission there developed pain in the left groin. At no time did the patient have an elevated temperature. He was admitted to the hospital for biopsy of large lymph nodes in the inguinal region. This was done, and the pathologic diagnosis was acute inflammation. The leukocyte count was 8,200 per cubic millimeter of blood. On physical examination, a large, nontender fixed mass was palpated arising from the pelvis and extending upward in the left lower quadrant. An intravenous pyelogram (Fig. 8) was taken, and it was the impression that a large retroperitoneal mass was present, not intimately connected with the kidney but pushing it up. A barium enema showed diverticulitis but no displacement of the bowel. The preoperative diagnosis was "tumor or cyst." At operation a large retroperitoneal abscess was incised and drained. The kidney was not involved by the mass, but the lower pole was rotated upward and anteriorly. The cavity contained more than a quart of pus. After evacuation, careful digital exploration revealed its extension to the large vessels on the left. The pathologic report of a segment of the wall of the cavity was "inflammatory fibrous wall containing striated muscle with acute and chronic exudate."

SUMMARY

Eight typical cases of retroperitoneal tumor are presented. Three patients did not have any complaints, and the tumors were discovered incidentally. The other 5 had consulted physicians during periods ranging from one to nine years for the same complaints for which operation was performed. A good abdominal roentgenogram would have visualized most of these masses. A definite preoperative diagnosis was made in only 1 of the 8 cases, the case of adrenal tumor.

It is concluded that (1) the application of modern methods of investigation should increase the percentage of accurate preoperative diagnosis, and (2) The combined use of roentgenographic procedures is also of value.

SUMARIO

São apresentados sito casos tipicos de tumor retroperitonial. Tres dos pacientes ão apresentavam queixa alguma e os tumôres foram descobertos incidentalmente. Os outros cinco haviam consultado medicos durante periodos variaveis entre um a nove anos, pelas mesmas queixas pelas quais as operações foram executadas. Um bom rontgenograma abdominal teria vizualizado a maioria desses tumôres. Um diagnostico preoperatorio definitivo foi somente feito em 1 dos 8 casos, sendo ele um tumor adrenalinico.

Conclue-se que (1) a aplicação de metodos modernas de investigação deveria aumentar a percentagem de diagnostico preoperatorio acurado e (2) que o uso combinado de processos roentgenograficos é tambem de valôr.

RÉSUMÉ

On présente 8 cas typiques de tumeurs rétro-péritonéales. Trois patients ne présentaient aucun symptome et la tumeur fut une découverte accidentelle. Les cinq autres patients avaient consulté leur médecin durant une période d'un à cinq ans pour les raisons opératoires. Une radiographie simple de l'abdomen aurait démontré la masse dans la plupart des cas. Le diagnostic opératoire fut fait dans un seul cas, celui d'une tumeur surrénale.

En conclusion, on devrait se servir des prócédés usuels d'investigations mis à la disposition de chacun afin de porter un bon diagnostic pré-opératoire et surtout de se servir de la radiographie.

ZUSAMMENFASSUNG

Acht typische Faelle von retroperitonealem Tumor werden berichtet. Drei Kranke hatten keinerlei Beschwerden, die

Geschwuelste wurden zufaellig entdeckt. Die uebrigen fuenf hatten ihre Aerzte ein bis neun Jahre vor der Operation wegen der gleichen Beschwerden, die schliesslich zur Operation fuehrten, konsultiert. Eine gute Roentgenaufnahme des Bauches haette die meisten dieser Geschwuelste zur Darstellung gebracht. Eine bestimmte praeoperative Diagnose wurde nur in einem der acht Faelle, bei einem Nebennierentumor, gestellt.

Es wird gefolgert, dass, erstens, die Anwendung moderner Untersuchungsmethoden den Prozentsatz richtiger praeoperativer Diagnosen erhoehen muesste, und dass, zweitens, der Wert von Roentgenaufnahmen nicht unterschätzt werden sollte.

RIASSUNTO

Vengono presentati 8 casi tipici di tumore retroperitoneale. Dei pazienti, 3 non avevano alcun disturbo e il tumore venne scoperto incidentalmente. Gli altri 5 avevano interpellato il medico in periodi variabili da 1 a 9 anni prima, lamentando gli stessi disturbi per cui furono poi operati. Un buon radiogramma addominale avrebbe visualizzato la maggior parte delle masse. Su 8 casi si ebbe una sola diagnosi preoperativa giusta, quella di tumore surrenale.

Si conclude che l'applicazione dei metodi d'indagine moderna aumenterebbe la percentuale delle diagnosi preoperative corrette e che la combinazione con procedimenti radiografici sarebbe di grande aiuto.

RESUMEN

Se presentan ocho casos típicos de tumor retroperitoneal. Tres pacientes no tuvieron molestias y los tumores se descubrieron incidentalmente. Los cinco restantes consultaron durante períodos de uno a nueve años por molestias similares, por las que fueron operados. Un buen röntgenograma abdominal habría mostrado la mayoría de estas masas. Solamente se hizo diagnóstico preoperatorio definido en uno de los casos, el de un tumor suprarrenal.

Se concluye que: (1) la aplicación de métodos modernos de investigación deben aumentar el porcentaje del diagnóstico preoperatorio exacto; (2) el uso combinado de procedimientos röntgenográficos es también de valor.

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A Clinicopathologic Correlation of Parotid Tumors with Therapeutic Applications

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THE successful management of parotid tumors is dependent on understanding of the natural history of these growths and knowledge of the surgical anatomy of the area. Numerous articles have recently appeared, adequately covering the surgical technic involved. Books and papers have also been published on the histopathologic character and clinical behavior of these tumors. These publications, however, in many instances have caused some confusion in the mind of the clinical reader because of lack of correlation among the various authors with respect to terminology and the interpretation of the morphology and presumed genesis of these lesions. What the surgeon requires is a histopathologic diagnosis that carries with it a currently accepted clinical pattern. With this at hand, specific therapy can be applied in accordance with the surgical principles which have recently been described in the therapeutic press.

Histopathologic Picture.—In a recently published textbook on pathology, Bauer[1] divided parotid tumors into at least seven groups, on a combined morphologic and genetic basis. He described adenomyoepithelioma, basophilic oncocytoma without lymphoid increments, papillary cystadenolymphoma, papillary cystadenoma without lymphoid changes, mucoepidermoid tumors (benign and malignant), infiltrating adenocarcinoma, and mixed tumors. The last-mentioned group is further divided into three categories: (1) the type with both epithelial and stromal components, with cartilage and bone; (2) the primarily stromal type of myoepithelial origin, but without bone or cartilage, and (3) the primarily epithelial type with solid glandular elements and papillary cystic formations. Ackerman and del Regato[2] recognized four categories. The benign group is composed of adenoma, papillary cystadenolymphoma, mixed tumor and mucoepidermoid tumor. The semimalignant group covers mucoepidermoid tumors and adenocarcinomas resembling cylindromas and basal cell tumors. A malignant group includes epidermoid carcinoma and unclassified carcinoma. The sarcomas are placed in the fourth group. Ahlbom[3] similarly divided parotid tumors into benign, semimalignant and malignant groups. In the category of malignant tumors he included some mixed tumors, cylindromas with basal cell characteristics, tumors of the solid basal cell type, some papillary cystic tumors, the more typical adenocarcinoma and squamous carcinoma types, and the undifferentiated carcinomas. Ewing[4] divided them into benign adenoma and papillary cystadenolymphoma, malignant adenocarcinoma, myxochondrocarcinoma, basal cell carcinoma with hyaline stroma and adencystic epithelioma. McFarland[5] mentioned mixed tumors as such and subgroups of endotheliomas, adenomas, myxochondromas, enclavomas, branchiomas, sarcomas and adenocarcinomas.

A study of other texts and publications will yield even more variations in nomenclature, based primarily on morphologic variations as perceived and individualized by the authors. That the mixed tumor and its many variants have their origin in the epithelial duct is fairly well accepted, the variants being accounted for on the basis of degenerative changes and metaplasia

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of both the epithelial cells and the mucus as it permeates and acts upon the non-neoplastic stroma. From the clinician's point of view this is an impractical oversimplification, as certain of these variants follow more or less specific clinical courses. Such differentiation on the part of the pathologist would permit the clinician to put into effect a therapeutic regimen based upon his knowledge of the natural history of these larger subgroups of parotid tumors.

Management.—The question whether all mixed tumors are potentially malignant is not important. If the tumor is of the mixed variety and is still encapsulated and there is no evidence of metastasis to the regional nodes or to distant areas, it is clinically managed in the same way whether it is reported to be benign or malignant. This includes tumors with a basal cell picture, with myxomatous, cartilaginous or osseous elements and with adenocystic or cylindromatous patterns in mixed proportions. The primary objective in the management of this tumor is its complete removal, including all of its capsule. To attempt to enucleate or curet out such a tumor not only invites recurrence but makes subsequent surgical extirpation more difficult and hazardous. It is not necessary to remove all of the parotid gland, but, in order to eliminate the tumor, it is essential that a core of parotid tissue be removed with it to insure complete eradication of the capsule. The capsule is very thin but quite distinct and is almost invariably invaded at many points by elements of the tumor. The more slowly the tumor grows, the more distinct this capsule will become. It is also intimately adherent by loose septal connections to the adjacent tumor and parotid gland. The suggestion that removal will be safer if he toughens the capsule by increasing its fibrotic elements with preoperative irradiation seems rather questionable, as the intimate loose septal connections would undergo similar changes, thus binding the adjacent parotid gland and tumor more rigidly to the capsule. More than ever, then, would it be necessary to stay wide of the capsule in removing such a tumor. Only when the capsule is in apparent contact with the rami of the facial nerve or extraparotid structures can one safely dissect close to the capsule without fear of leaving remnants behind. The deep fascia which lies between the tumor capsule and these extraparotid structures on the one hand and the facial nerve on the other make surgical separation technically safe if carefully performed.

After previous surgical measures these advantages are lost, for all of the surgically opened spaces and fascial planes covering the adjacent nerves and muscles are intimately adherent and bound down by fibrous septa to the recurrent tumors. In addition, the entire previously explored surgical field is a potential site of recurrent tumors. These recurrent tumors are the result of microscopic elements of capsule with tumor left *in situ* in the periphery of the surgical field. As these well-embedded and naturally attached tumor elements begin to grow, they do so centrifugally and along the paths of least resistance in the surgically opened planes and the overlying cutaneous scars. Reoperation must, therefore, be so planned as to remove the entire field previously explored, whether grossly visible or palpable tumors are present or not. Preservation of the branches of the facial nerve under such conditions becomes more difficult, as the natural fascial barriers between the nerve and the parotid gland have been destroyed, permitting intimate contact of the recurrent tumor with the nerve.

Since malignant mixed tumors rarely metastasize to the regional lymph nodes, an elective radical dissection of the neck is not indicated. If positive nodes are present at the time the primary lesion is treated, a dissection "in continuity" can be carried out. Otherwise, delayed therapeutic radical dissection of the neck can be performed if and when metastatic involvement of the lymph nodes appears.

Recently Stewart[6] has described a group of lesions called mucoepidermoid tumors, which formerly were included with the

mixed tumors. Many tumors once classified as epidermoid or squamous cell carcinomas fall into this category. They are usually encapsulated and clinically resemble mixed tumors. They are of epithelial duct origin, take the mucicarmine stain, and have distinct histopathologic characteristics. In Stewart's small series, about 50 per cent of the tumors metastasized to the regional lymph nodes, and in this group the authors were able to detect microscopic criteria that labeled the primary lesions as metastasizing or nonmetastasizing types. Currently, therefore, with a diagnosis of nonmetastasizing muco-epidermoid tumor, an adequate and complete local excision of the tumor is all that is indicated. If the growth is metastasizing, an elective radical cervical dissection should be performed, either "in continuity" if the diagnosis is made before or at operation, or as a second-stage procedure. The presence of metastatic growths in the nodes indicates immediate therapeutic radical dissection of the neck.

Infiltrating adenocarcinoma of the parotid gland is a rare and more rapidly growing neoplasm, which in origin and spread resembles duct carcinoma of the breast. It is nonencapsulated and diffuse, usually doughy to firm, and associated with pain and often pretherapeutic paralyses of the facial nerve. It readily metastasizes to the regional lymph nodes. The indicated treatment is wide local removal of the tumor with any and all branches of the facial nerve that enter or are adherent to the primary lesion combined with a radical elective or therapeutic dissection of the neck "in continuity".

All of the preceding lesions can currently be accepted as arising in the epithelial lining of the parotid ducts or acini, the variants being due to a different rate of growth, which, in turn, determines the reaction of the host tissue and the degenerative and metaplastic intratumoral changes. The papillary cystadenolymphoma (adenolymphoma, Warthin's tumor, etc.) undoubtedly has a different origin. It probably is unrelated to the parotid gland and is located in the parotid area because of its presumable branchiogenic origin. It has a distinct histopathologic pattern of acidophilic columnar cells arranged in papillary and cystic formation and embedded in a lymphatic stroma. Grossly, the lesions resemble gray to purple lymph nodes. Frequently they are outside the parotid gland, although they may be within its substance. They may be multiple and bilateral. They are benign. If the diagnosis is known, they may be observed, treated by irradiation or surgically excised, as indicated by the cosmetic deformity or pressure symptoms they may produce.

SUMMARY AND CONCLUSIONS

Adequate management of parotid tumors is dependent on a knowledge of the surgical anatomy of the region and an understanding of the natural history of these tumors. The therapist must come to a definite understanding with his pathologist so that he can apply the correct clinical picture to the histopathologic diagnosis. With such a clinicopathologic correlation, he is able to institute a specific, currently accepted therapeutic regimen.

A workable grouping of parotid tumors is presented, which the clinician can use in selecting indicated therapy. This consists of mixed tumors, benign and malignant; muco-epidermoid tumors, metastasizing and nonmetastasizing; infiltrating adenocarcinoma, and papillary cystadenolymphoma.

The indications for local limited or wide excision and radical cervical dissection, elective or therapeutic, are outlined.

The rationale for the removal of a "housing" of parotid tissue in the local excision of an encapsulated parotid tumor is given. In order to perform this safely it is first necessary to identify the facial nerve. Numerous recent papers in the medical literature have adequately emphasized and described the surgical anatomic aspects and the proper approach.

RIASSUNTO E CONCLUSIONI

La cura dei tumori della parotide dipende dalla conoscenza dell'anatomia chirurgica della regione e della storia naturale di questi tumori. Il terapista deve formarsi un'idea assieme all'anatomopatologo così da adattare il quadro clinico alla diagnosi istopatologica. Con tale integrazione egli può attuare la terapia specifica.

Viene presentata una classificazione pratica dei tumori della parotide che il chirurgo può usare nello sciegliere la terapia adatta. Essa comprende i tumori misti, benigni e maligni, i tumori mucoepidermoidi, metastatici e non metastatici, l'adenocarcinoma infiltrante e il cistoadenolinfoma papillare.

Vengono indicate le indicazioni per l'asportazione locale limitata o allargata e per la dissezione radicale del collo, elettiva o terapeutica.

Vengono forniti i criteri per l'asportaziòne di tessuto parotideo durante l'ablazione di un tumore incapsulato. Per poter far ciò è necessario, prima di tutto, identificare il nervo facciale. Esitono numerosi studi recenti sugli aspetti anatomo-chirurgici della questione e sulla corretta via di aggressione.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Eine ausreichende Behandlung von Parotisgeschwuelsten beruht auf der Kenntnis der topographischen chirurgischen Anatomie und auf dem Vertrautsein mit der Naturgeschichte dieser Tumoren. Um das klinische Bild mit der histologischen Diagnose in Einklang zu bringen, muss der behandelnde Arzt zu einem voelligen Einverstaendnis mit dem Pathologen gelangen. Nach Erzielung klinisch-pathologischer Uebereinstimmung ist der Arzt in der Lage, eine spezifische zur Zeit anerkannte Behandlung einzuleiten.

Es wird eine praktisch brauchbare Klassifizierung der Parotistumoren vorgelegt, deren sich der Kliniker bei der Auswahl einer geeigneten Therapie bedienen kann. Die Einteilung umfasst gutartige und maligne Mischgeschwuelste, metastatische mucoepidermoide Tumoren, das infiltrierende Adenokarzinom und das papillaere Zystadenolymphom.

Die Indikationen fuer oertlich limitierte oder umfangreiche Exzisionen un fuer radikale—elektive oder therapeutische—Praeparierung der Halsgegend werden umrissen.

Die Gruende fuer die Entfernung einer "Huelle" von Parotisgewebe bei oertlicher Exzision eines abgekapselten Parotistumors werden erklaert. Um eine solche Operation sicher auszufuehren, ist es notwendig, erst den Fazialnerven zu identifizieren. Die chirurgisch-anatomischen Aspekte und die geeigneten Zugangswege sind in neueren Arbeiten der medizinischen Literatur ausreichend und nachdruecklich eroertert worden.

RÉSUMÉ

Le diagnostic des tumeurs de la parotides dépend de la connaissance de l'anatomie chirurgicale de la région et de la consistance de la tumeur. Le clinicien doit arriver aux mêmes conclusions que le pathologiste afin de poser un diagnostic histologique précis. Avec cette collaboration clinique et pathologique, il est possible d'établir une thérapeutique adéquate.

L'auteur présente plusieurs cas de tumeur de la parotide parmi lesquels le médecin s'est servi de la thérapeutique spécifique pour chaque cas. Il y a des tumeurs mixtes, bénignes et malignes; muco-épidermoïdes, métastatiques et non-métastatiques; adénocarcinome infiltrant et cystadénolymphose papillaire.

L'auteur souligne les indications d'excision et de dissection cervicale.

De toute première importance, il faut reconnaître le nerf facial.

Plusieurs travaux récents dans la littérature médicale sont sérieux et décrivent le mode d'opération.

RESUMEN

El manejo adecuado de los tumores parotídeos depende del conocimiento de la ana-

tomía quirúrgica regional y de los antecedentes de dichos tumores. El terapeuta debe llegar a un entendimiento definido con su patólogo, a fin de aplicar el cuadro clínico correcto al diagnóstico histopatológico. Dicha correlación clinopatológica lo capacita para instituir una terapéutica específica ordinariamente aceptada.

Se presenta un grupo de tumores parotídeos, en los que el clínico puede seleccionar la terapéutica indicada. Dicho grupo consiste de tumores mixtos, benignos y malignos; tumores mucoepidermoides, metastásicos y no metastásicos; adenocarcinoma infiltrante y cistoadenolinfoma papilar.

Se precisan las indicaciones de la excisión local amplia o limitada y la disección cervical radical, electiva o terapéutica.

Se da la razón para la extirpación de tejido parotídeo "encasquillado" en la excisión local de un tumor parotídeo encapsulado. Debe indentificarse ante todo el nervio facial para seguridad. En la literatura se dispone de recientes artículos sobre los aspectos anatomoquirúrgicos y la vía apropiada.

SUMÁRIO E CONCLUSÒES

O manuseio adequado de tumores da parotida depende do conhecimento da anatomia cirurgica da região e da compreensão da historia natural desses tumôres. O terapeuta deve chegar a um definido entendimento com seu patologo de tal modo que ele possa aplicar o correto quadro nosologico ao diagnostico histopatologico. Com tal correlação clinicopatologica, ele estara habilitado a instituir um regimen terapeutico correntemente aceito.

Um grupo de tumores da parotida apropriado para estudo é apresentado, o qual podera ser usado pelo clinico para seleção de terapeutica apropriada. Consiste de tumores mixtos, benignos e malignos; tumores mucodermoides, metastaticos e nãometasticos; adenocarcinoma infiltrativo e cistadenolinfoma papillar.

São esboçadas as indicações para excisão local ou ampla e para dissecção radical do pescoço, eletiva ou terapeutica.

Sao dadas as razões para remoção de parte do tecido parotidiano em excisões locais de um tumor encapsulado deste orgao. Em ordem a executal-a com segurança é primeiramente necessario identificar o nervo facial.

Numerosos trabalhos recentes na literatura medica tem adequadamente realçado e descrito os aspetos anatomicos e cirurgicos bem como a propria abordagem cirurgica.

Foreign Interns and Residents Available

Approved hospitals in the United States and Canada having openings for interns and residents are requested to communicate with the Secretariat of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Tumors and Cysts of the Neck

ARNOLD S. JACKSON, M.D., F.A.C.S., F.I.C.S.
MADISON, WISCONSIN

THE subject of tumors and cysts of the neck is one about which volumes have been written. It is one of the most fascinating, yet puzzling, subjects confronting the internist, the surgeon and the pathologist. Much has been discovered about these lesions, but a great deal more remains to be learned about them. Possibly in no other part of the body do so many distinct pathologic entities occur in so small an area.

In recent years I have advocated the streamlining of medical papers, but an attempt to apply this method of discussion to a subject of such magnitude is to tax one's ingenuity. Of necessity, one can merely outline the subject, emphasizing only the most important diagnostic and surgical points, and refer the reader to such texts as Hertzler's and the recent publication by Ward and Hendrick for more detailed study.

For this presentation I have drawn on an experience with a considerable number of patients observed over more than three decades.

No classification ever has or, probably, ever will prove satisfactory to those interested in this subject. The one here presented is compiled from the work of others as well as myself and is offered merely as a working hypothesis:

Classification of Tumors and Cysts of the Neck

1. Tumors of the thyroid and parathyroid glands
   Thyroid: adenoma; carcinoma; sarcoma
   Parathyroid: adenoma; carcinoma
2. Tumors of the salivary glands
   Mixed tumor
   Primary malignant neoplasm
   Cysts
3. Primary tumors of the lymph glands
   Hodgkin's disease
   Lymphosarcoma
   Lympho-epithelioma
   Leukemia
   Endothelioma
4. Secondary tumors of the neck
   Metastasis from the buccal cavity
   Direct extension from the buccal cavity
   Metastasis from below the clavicle
5. Benign tumors
   Lipoma
   Myoma
   Dermoid
   Chondroma
   Hemangioma
   Lymphangioma
   Atheromatous cyst
   Sebaceous cyst
   Fibroma
   Adenoma
   Keloid
   Cylindroma
   Xanthoma
6. Unusual tumors
   Mikulicz's disease
   Carotid body tumor
   Neuroblastoma
   Neurofibroma
   Ganglioneuroma
   Boeck's sarcoid
7. Cysts and fistulas
   Thyroglossal
   Branchial: benign; malignant
   Hygroma
8. Inflammatory lesions
   Nonsuppurative lymphadenitis
   Suppurative lymphadenitis
   Tubercular lymphadenitis
   Diffuse cellulitis (Ludwig's angiana)
   Actinomycosis
   Blastomycosis
   Sporotrichosis

The large and debatable subject of thyroid tumors might be summarized as follows: Where preventive work has been carried on in certain areas for several decades, as it has in Switzerland, Ohio, Michigan and Wisconsin, the incidence of

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adenomatous goiter has been markedly decreased by the administration of iodine to the school children. It has been generally believed that malignant lesions of the thyroid develop in a preexisting adenomatous goiter, and the incidence varies from as high as 20 per cent in the solitary adenoma of the male to 4 per cent in the multiple adenomas. In a high percentage (31 per cent) of my own series of 53 cases the presence of the malignant growth was not suspected prior to operation. This type of tumor responds favorably to surgical treatment and irradiation, in contrast to the diffuse adenocarcinomas. The papillary adenocarcinoma often observed in young persons is prone to metastasize locally to the adjacent lymph glands and generally offers a favorable prognosis. This type formerly was known as aberrant or lateral thyroid. The rare sarcoma is highly malignant. I have had 1 patient with endothelioma in whom a recurrence developed twenty-four years after thyroidectomy and radium therapy. She is still alive after subsequent high voltage roentgen therapy. Radioactive iodine has not cured a patient with a malignant thyroid tumor, but it is helpful in some instances.

Parathyroid tumors are relatively rare, may not be apparent locally even on surgical exploration, are evidenced by hypercalcemia and changes in the osseous structure and may be associated with renal calculi. Their removal may result in a spectacular alleviation of symptoms.

Tumors of the salivary gland may be cystic, benign, mixed or primarily malignant. The important point to remember about the commonest of these lesions, a mixed tumor of the parotid gland, is that it should be removed early, while the capsule is intact. If this is done, a cure may be expected; otherwise it may be necessary to sacrifice one or more branches of the facial nerve. Sistrunk's operation has been the classic procedure for these tumors, although some improvements in technic have recently been suggested by McNealy, Brown and others.

None of the primary tumors of the lymph glands responds successfully to treatment; nitrogen mustard gas and roentgen therapy merely delay the inevitable. There is no clear-cut differentiation among many of the tumors in this group, lymphoblastoma being a generalized term indicating that the tumor is due to proliferation of lymphoid tissue. Although Hodgkin's disease is usually encountered in young persons and lymphosarcoma in elderly persons, there are many exceptions. In differentiating Hodgkin's disease from other glandular tumors of the neck, one usually finds that this disease causes a discrete enlargement of one or more lymph glands, usually situated in the posterior triangle of the neck. Subsequently glandular adenopathic change may appear in the axilla and groin, and a roentgenogram may demonstrate mediastinal involvement. Dense fibrosis develops as the disease progresses. A positive diagnosis is determined only by performing a biopsy and finding the characteristic Sternberg-Reed cells. Roentgen therapy is considered the best first line of defense; some patients respond remarkably well and live for years, while in others fever, secondary anemia and malaise may develop and the patient succumbs in a few months.

In lymphosarcoma the disease tends to invade the capsule of the lymph glands and extend to surrounding tissues; the cells are uniform and fibrosis does not occur. Hodgkin's disease, on the other hand, tends to affect successive groups of glands in the manner of a constitutional disease. A sarcoma begins in a single gland or closely related glands, whereas in Hodgkin's disease one or more groups of glands may be involved. A sarcoma grows rapidly, tends to bulge up beneath the upper portion of the sternocleidomastoid muscle, and is apt to invade the skin, so that the latter becomes reddened and even appears to fluctuate. Surgical removal may often prove to be a formidable procedure. In some cases in which the diagnosis of sarcoma had previously been made by others, I have been frankly surprised to find not a sarcoma but perhaps an infected branchial cyst. Although in

the presence of sarcoma life expectancy is often a matter of only a year or two, an occasional patient treated early may be carried for several years with surgical and roentgen therapy. These tumors kill not so much by affecting the general health, as does Hodgkin's disease, as by attacking important adjacent structures, such as the trachea, the esophagus and the large vessels.

A lympho-epithelioma may appear first as an enlarged gland just beneath the angle of the jaw. Although it may arise from the nasopharynx, in many cases its primary source may never be located. The diagnosis is confusing not only to the surgeon but to the pathologist, since lymph and epithelial cells may coexist and the tumor be indistinguishable from a sarcoma. This tumor is extremely painful, and its appearance may precede or follow the appearance of a pharyngeal tumor. It is firmer and more fixed than the sarcoma or the tumor in Hodgkin's disease and often remains unilateral.

An endothelioma clinically resembles the tumors of this group but is far less malignant; patients suffering from this unusual lesion may live for many years after operation and roentgen therapy. An extremely rare case was that of a large hemangio-endothelioma of the salivary gland which I removed from a 4-month-old baby. The child recovered.

The story of leukemia is too well known to need reiteration here. Whether it is the acute fulminating type that so often strikes a child or a young adult or the chronic form that more commonly attacks persons in middle age, none survive. It is perhaps the most deadly of all glandular diseases. Fatigue, bleeding gums, an enlarged spleen, glandular adenopathic change, fever, loss of weight, and an altered blood picture and bone marrow picture lead to the diagnosis. Roentgen therapy and mustard gas prolong life but offer no cure.

A secondary tumor of the neck may give the first indication of disease elsewhere, as Virchow's node may indicate carcinoma of the stomach. Various lesions of the buccal cavity, such as carcinoma of the tongue, frequently manifest themselves by metastasis to the cervical lymph glands.

In the list of benign tumors of the neck the most frequently encountered and the simplest to remove is the lipoma. This tumor is soft and freely movable. Its diagnosis is seldom puzzling, yet because of its location it may occasionally resemble a dermoid or a thyroglossal cyst.

Next in frequency is the common sebaceous cyst, equally easy to recognize and dispose of, although one should emphasize that it must be removed entirely to prevent recurrence. This is also true in the case of the harmless lipoma.

The myoma, the dermoid, the fibroma and the remainder of the tumors in this group are less common, seldom troublesome and chiefly of pathologic interest. In my experience, the keloid is best treated by excision with the electrosurgical knife followed immediately with radium.

Of the unusual tumors of the neck I wish to mention briefly Mikulicz's disease, of which fewer than 100 cases have been reported, 2 of which were on my service. One case was that of a middle-aged man who was the first patient to be treated successfully with penicillin. The patient in the second case, a young mother, required surgical removal of the tumor plus penicillin therapy to effect a cure. This disease is characterized by the absence of salivary flow, an extreme parchment-like condition of the tongue, narrowing of the palpebral fissures and involvement of the salivary glands.

Tumor of the carotid body is uncommon, fewer than 400 cases having been reported. Although this tumor may be malignant, its rate of growth is protracted so that patients may live for years. The tumor is so slow to invade the carotids that its early diagnosis may permit removal without too great a risk. The external carotid is involved first, but when the common carotid becomes invaded, ligation of this vessel in older persons is attended with a high mortality rate. This tumor may push the sternocleidomastoid

muscle forward, giving the appearance of a sarcoma, but at operation it is seen to arise from the carotid notch.

Still more unusual are tumors of nerve origin, a small group including neuroblastoma, neurofibroma and ganglioneouroma, all of which clinically suggest Hodgkin's disease and are recognized only at operation. Boeck's sarcoid tumor of the neck may suggest Hodgkin's disease in an early stage. Usually cutaneous manifestations and uveitis accompany a sarcoid lesion.

The thyroglossal cyst, the result of a congenital abnormality in the development of the thyroid gland, is situated in the midline of the neck, anywhere between the thyroid and the base of the tongue. It is the result of a persistent thyroglossal duct, which may end at the hyoid bone or pass through, above or below it. When the duct extends to the base of the tongue its surgical removal may be difficult, and failure has not infrequently subjected many patients to repeated operation. A thyroglossal cyst may persist until middle age without causing symptoms; it may become infected and rupture spontaneously, only to heal and later repeat the process. Sometimes it is lanced, and then a discharging sinus may develop. Sistrunk's classic procedure still offers the best approach to the removal of these cysts. I have followed his technic in operating on a series of 28 patients, except that all operations have been done with nerve block anesthesia. For children I postpone operation, preferably until the fifteenth year, so that the child is able to cooperate better. The cyst is dissected to the hyoid bone, the center of which is resected; then, if the cyst continues to the base of the tongue, its course is carefully followed and all tissue removed. The hyoid bone is usually resutured with fine chromic catgut and the incision closed without drainage. If all of the cyst is removed, recurrence will not develop.

The branchiogenic cyst results from a failure of the upper part of the gill clefts to become obliterated. It has a deep origin, often arising from between the jugular vein and the carotid artery, and bulges into the neck as a smooth soft mass from beneath the sternocleidomastoid muscle. It may become infected and be mistaken for a sarcoma. In 2 instances in my series operation revealed malignant change. The removal of the cyst involves careful dissection among the important structures of the neck and may be accomplished with nerve block anesthesia.

Thyroglossal and branchiogenic fistulous tracts may occur and may undergo malignant change. Finally, there remains the group of inflammatory lesions of the neck, which are apart from the subject of this discussion.

In conclusion, it may be said that tumors and cysts of the neck form one of the most interesting diagnostic and surgical problems, a problem that in many instances offers insurmountable obstacles and yet frequently rewards the surgeon with unexpected and gratifying results.

SUMMARY

The author has drawn on thirty years' experience to classify fifty different kinds of tumors and cysts of the neck. In discussion of thyroid tumors, preventive work and the incidence of malignant change are more particularly referred to. Special reference is made to parathyroid tumors, salivary gland tumors, primary tumors of the lymph glands, Hodgkin's disease, lymphosarcoma lympho-epithelioma, endothelioma, leukemia, benign tumors of the neck, Mikulicz's disease, tumors of the carotid body, thyroglossal cysts and branchiogenic cysts. Inflammatory lesions of the neck are not discussed in detail.

RESUMEN

Se clasifican cincuenta diferentes clases de tumores y quistes del cuello, según la experiencia de 30 años al respecto del autor. A propósito de tumores tiroideos, se hace particularmente referencia de la prevención y la degeneración maligna de los mismos. Se hace referencia especial sobre tumores paratiroideos, de las glándulas salivales, primarios de las linfo-

glándulas, enfermedad de Hodgkin, linfosarcoma, linfoepitelioma, endotelioma, leucemia, tumores benignos del cuello, enfermedad de Mikulicz, tumores del cuerpo carotídeo, quistes tiroglosos y bronquiogénicos. No se discuten en detalle las lesiones inflamatorias cervicales.

RÉSUMÉ

L'auteur a passé 30 années de sa pratique à classifier 50 variétés différentes de tumeurs et de kystes du cou. On note celles de la thyroïde, de la parathyroïde, des glandes salivaires, des glandes lymphatiques, de la maladie de Hodgkin, du lymphosarcome, de l'endotheliome, de la leucémie, etc.

Les lésions inflammatoires du cou sont passées rapidement.

RIASSUNTO

L'Autore ha cercato, con una esperienza trentennale, di classificare 50 differenti varietà di tumori e cisti del collo. Trattando i tumori della tiroide viene dato particolare valore al lavoro preventivo e alla frequenza delle trasformazioni maligne. Uno speciale interesse è dedicato ai tumori delle paratiroidi, delle ghiandole salivari, ai tumori primitivi delle linfoghiandole, alla malattia di Hodkins, al linfosarcoma, all'endotelioma, alla leucemia, ai tumori benigni del collo, alla malattia di Mikulicz, ai tumori del glomo carotico, alle cisti tireo-glosse e branchiali

Le lesioni infiammatorie del collo non sono state trattate diffusamente.

SUMARIO

O autor demorou trinta anos apos cuja experiencia classificou cincoenta diferentes classes de tumores e cistos do pescoço. Na discussão de turmoes da tiroide, o trabalho preventivo e a incidencia de alteração maligna são mais particularmente abordados. Especial referencia é feita aos tumores da paratiroide, tumores das glandulas salivares, turmoes primarios das glandulas linfaticas, doença de Hodgkin, linfosarcoma, linfoepitelioma, endotelioma, leukemia, tumores benignos do pescoço, doença de Mikulicz, tumores do corpo carotidiano, cistos thiroglassos e cistos branquiogenicos. Lesões inflamatorias do pescoço não são discutidas em detalhe.

ZUSAMMENFASSUNG

Der Verfasser klassifiziert, gestuetzt auf eine 30-jaehrige Erfahrung, 50 verschiedene Tumoren und Zysten des Halses. Bei der Besprechung der Schilddruesengeschwuelste wird auf die Prophylaxe und auf das Vorkommen boesartiger Veraenderungen naeher eingegangen. Besondere Beachtung erfahren die Geschwuelste der Nebenschilddruese, der Speicheldruese, die primaeren Lymphknotentumoren, die Hodgkinsche Krankheit, das Lymphosarkom, das Lymphoepitheliom, das Endotheliom, die Leukaemie, gutartige Geschwuelste des Halses, die Mikuliczsche Krankheit, die Geschwuelste des Karotisknotens, thyreoglossale Zysten und branchogene Zysten. Auf entzuendliche Erkrankungen des Halses wird nicht naeher eingegangen.

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Pancreatitis: Current Concepts

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ACUTE inflammatory diseases of the pancreas have been known as pathologic and clinical entities since the middle of the last century. These lesions were recognized sporadically at autopsy and, when symptoms were severe, at operation. Then, as now, acute pancreatitis could be only suspected, not diagnosed, by clinical manifestations alone. The desirability, therefore, of a specific pathognomonic indication of the presence of such disease was obvious. In 1909 Wohlgemuth[1] reported increased diastatic activity in the urine in the presence of acute pancreatic disease, and after this the possibilities inherent in determination of pancreatic enzymes in blood and urine seemed promising. Effective realization came with the method of blood disease estimation reported from the laboratory of this hospital by Somogyi in 1934.[2] With the availability of an accurate, reproducible and rapid method of estimating blood and urine diastase it soon became apparent, after correlation of postmortem and operative data, that this procedure constituted a highly specific test for the diagnosis of acute pancreatic inflammation. Shortly after publication of this method the true incidence of acute pancreatitis became apparent. Since 1934 the Jewish Hospital in St. Louis has admitted over 200 patients with acute pancreatitis; diagnosis, in all instances, has been based on the combination of abdominal pain and an elevated diastase level in the blood or urine. Owing to increasing familiarity with the disease, the frequency of its recognition has become greater. In recent years acute pancreatitis has accounted for about 0.3 per cent of all hospital admissions. This hospital has been continuously active in investigating inflammatory disease of the pancreas and in the recent past has established a separate laboratory devoted to these investigations. The principal participants are Drs. C. J. Heifetz, L. A. Sachar, M. Somogyi, Morton D. Pareira, and myself. The purpose of this report is to present our current concepts of acute pancreatitis as based on our investigations, clinical experience and performance of more than 100,000 clinical diastase determinations.

In the case of a patient with abdominal pain, the diagnosis of acute pancreatitis rests upon the presence of an elevated blood or urine diastase (or lipase) content or upon demonstration of the characteristic morbid anatomic picture. Surgical intervention is not indicated in the therapy of acute pancreatitis, and it is therefore fortunate, from the diagnostic standpoint, that the blood and urine diastase levels are elevated in the early stage in practically all cases. With this importance attaching to the diastase determination, it behooves the clinician to be well acquainted with the behavior of this enzyme.

It has been repeatedly shown that blood and, consequently, urine diastase are elevated when the pancreatic ducts of experimental animals are obstructed. Presumably, then, it is ductal obstruction that gives rise to the elevated value for diastase in the presence of clinical pancreatitis. Experimentally, duct obstruction will produce only transient pancreatic edema and elevated values for blood and urine diastase. There are many clinical hypotheses regarding the cause of acute pancreatitis, and the disease has been produced experimentally in a number of

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ways, but the common denominator is the combination of ductal obstruction and some type of pancreatic trauma. There is no decisive evidence that either of these conditions alone will produce pancreatitis. Although the factors in the pathogenesis of clinical pancreatitis may be manifold, the actual cause is probably a combination of duct obstruction plus pancreatic tissue injury.

The normal range of blood diastase in man is 80 to 150 Somogyi units. In a state of fixed health the level in the given person is quite constant and is not subject to diurnal or postprandial fluctuation.[3] In the presence of acute pancreatitis the blood diastase content usually rises above 1,000 units. It has been our experience that the highest value for blood diastase is almost invariably revealed by the earliest specimen obtained, even though this is less than an hour after the onset of symptoms.[4] It is also the rule that consecutive specimens show a fairly progressive decline, so that the normal level is frequently reestablished within twenty-four to forty-eight hours. The height of the diastase level and the duration of its elevation do not parallel the clinical severity of the attack. Furthermore, there are no characteristic differences in the behavior of diastase in acute transient pancreatitis and acute pancreatic necrosis.

An elevated blood diastase level may also accompany other abnormal states. The most common of these is retention of normally excreted blood constituents due to renal disease. Renal retention may give rise to blood diastase levels as high as 1,200 units. The other abnormalities with which an elevated disastase content may be associated—obstructive and inflammatory diseases of the salivary glands, carcinoma of the pancreas and perforated duodenal ulcer (usually, but not always, posterior)—seldom give rise to levels over 1,000 units. In this connection it should be borne in mind that, among other conditions in which a blood diastase level of less than 1,000 units is present, is subsiding pancreatitis. Blood diastase levels of 1,500 units or more may be considered pathognomonic of acute pancreatitis. For an elevated diastase level of less than 1,500 units to be accepted as diagnostic of acute pancreatitis the other causes of diastase elevation must be eliminated. It is interesting to note that sometimes in the presence of azotemia there is a normal blood diastase level with a markedly decreased urinary clearance of the enzyme.[4] It thus appears that in some cases of azotemia diastase formation is depressed, or the enzyme is destroyed or sequestered in the body. Our group is currently investigating this phenomenon.

If renal retention is suspected in the case of a patient with a high blood diastase level, the significance of this level may be quickly established by determining the enzyme activity in the urine. It was observed in this laboratory, in 1937,[5] that the urine diastase level, unlike the blood diastase level, fluctuates markedly, but that it is always higher than that of the blood, in ratios between 2:1 and 6:1. The same ratios obtained with the elevated diastase levels associated with acute pancreatitis. These ratios were reversed in the presence of renal retention. More recently we have been determining the urinary diastase activity in terms of the hourly excretion rate (units excreted per hour). Urine to blood diastase ratios by this method of measurement are, again, disparate unless renal retention is present.

Further investigations have recently been made of the relation of blood diastase and urine diastase during the course of acute pancreatitis.[6] Blood and urine diastase bear no exact mathematical relationship during the acute disease, but their respnses are roughly parallel. In all of the cases studied the maximal urine diastase level (hourly excretion) was recorded almost simultaneously with the highest blood diastase level. In the presence of normal renal function an elevated blood diastase level induces an increased urinary diastase excretion in something less than two hours, probably in the space of minutes.

As has been indicated, determination of the urinary diastase excretion rate will quickly identify or exclude the factor of renal retention. The urinary diastase excretion rates alone may also serve as a diagnostic test of acute pancreatitis.

Much has appeared in the recent literature concerning the response of the blood diastase level to pancreatic stimulants and the employment of these responses as the bases for tests of pancreatic function. As we have pointed out,[7] such a test, to be valid, must fulfill one of three criteria: the stimulus must invariably cause the blood diastase levels of normal persons to rise; the stimulus may cause no elevation of the blood diastase level in normal persons, but causes such an elevation in persons in whom the main pancreatic duct is blocked; the stimulus may cause inconstant variations or elevations of the blood diastase level of both normal persons and persons with disease of the pancreas, but occasionally in the latter it produces the pain of which the patient complains. Prostigmine, mecholyl, secretin, morphine sulfate followed by mecholyl, and secretin were administered to four groups. A control group was selected of patients with a history of acute pancreatitis (in some recently subsided), patients with carcinoma of the pancreas and patients with pancreatic calculi. Serial blood diastase determinations were made on these patients as well as on a group who had received no medication. The control group with medication and a control group without medication showed no difference in diastase fluctuation. In other groups of patients no consistent rise in the blood diastase level was observed after administration of any of the stimulants, and in none of the patients was abdominal pain reproduced.

As we have mentioned, since 1934 more than 200 patients have been admitted to the St. Louis Jewish Hospital with acute pancreatitis. In this group there have been 9 deaths; autopsy revealed acute pancreatic necrosis in 7 instances and an absence of the pancreatic head and multiple liver abscesses in 1. Thus the mortality rate for acute pancreatitis has been about 6 per cent.

Although 50 per cent of our patients have been subject to recurrent episodes of acute transient pancreatitis, neither pancreatic insufficiency nor calculi have developed in any of them. These conditions are rare in our experience. In only 3 of our cases have pancreatic abscesses developed.

The nonoperative diagnosis of acute transient (interstitial) pancreatitis rests upon the combination of abdominal pain and an elevated blood or urine diastase level. Since there is no specific difference in the clinical manifestations or in the behavior of diastase whether the patient has acute transient pancreatitis or acute pancreatic necrosis, the diagnosis of acute pancreatic necrosis rests upon demonstration of the morbid anatomic status at operation or autopsy. There is nothing characteristic about the type of pain or the physical signs accompanying acute inflammatory disease of the pancreas. As a rule, however, the degree and persistency of shock in association with acute pancreatic necrosis is more marked than with acute transient pancreatitis. Since we do not operate for acute inflammatory disease of the pancreas, we cannot say with certainty whether a severe attack of "acute transient pancreatitis" is just that or acute pancreatic necrosis unless, of course, the patient dies and autopsy is performed. One can make a diagnosis of acute pancreatitis with assurance in the case of a patient with abdominal pain and a blood diastase level of over 1,500 units or a urine diastase excretion rate of over 1,200 units. In the presence of abdominal pain and a blood diastase level between 500 and 1,500 units a diagnosis of acute pancreatitis can still be made if the other causes of diastase elevation are excluded. It is to be noted that this differentiation at times necessitates exploratory laparotomy for the exclusion of perforated peptic ulcer. The facts being as they are, good medical practice requires that any patient with acute pain in the upper part of the abdo-

men be tested for blood or urine diastase content.

The therapy of acute pancreatitis presents three phases: treatment of the acute episode, management of the possible complications, and measures directed toward the interruption of recurrent attacks.

The fact that surgical intervention has nothing to offer the patient with acute pancreatitis is now commonly accepted. We have been firmly of this opinion since 1938.[8] The conservative management of the acute episode is smptomatic, supportive and prophylactic. The prominent, and usually sole, symptom of acute pancreatitis is pain of some degree. Narcotic and parasympatholytic drugs are commonly employed for relief. With respect to the former, our experience does not substantiate the opinion of some that morphine exacerbates the pain of acute pancreatitis. As for the latter drugs, though we have not used them extensively, we have no objective substantiation of the ability of banthine or atropine to ameliorate pain or to shorten the course of acute pancreatitis. Supportive care is necessary for those patients in whom shock is manifest, or whose attacks are so marked and prolonged that the nutritional requirements, in all components, cannot be met or are therapeutically diverted from the gastrointestinal tract. It is unnecessary here to detail the measures employable for shock and general supportive care. Prophylactic therapy of acute pancreatitis is aimed at decreasing the incidence of complication abscesses and purulent peritonitis by the use of antibiotics, and at lessening the severity and progression of the attack by depressing the secretory activity of the pancreas, which may be accomplished by gastric suction, the withholding of food by mouth and administration of antisecretory drugs.

Our experience has been that the majority of patients with acute pancreatitis recover fully without the necessity for supportive care and without employment of the prophylactic measures. When indicated, symptomatic and supportive care is, of course, essential. The value of prophylactic treatment in our cases cannot be objectively assayed. In our opinion, the possible value of antibiotics warrants their routine use in cases of acute pancreatitis. We do not routinely employ the antisecretory measures. In most cases, however, we do prohibit oral ingestion unitl there is some clinical improvement.

Delayed treatment of acute pancreatitis is primarily surgical, and is indicated when complications—pseudocyst or pancreatic abscess—arise, or when disease of the extrahepatic biliary tract is evident. We shall not elaborate on the former.

The high association of calculous disease of the biliary tract with acute pancreatitis has been well known since it was first pointed out by Opie.[9] There is no doubt, as was indicated by Opie in his common-channel theory, that biliary calculi are frequently the pathogenic basis of acute pancreatitis. It is also true, however, in our experience[10] and that of a great many others, that acute pancreatitis recurs in a distressingly significant number of patients after surgical eradication of disease of the biliary tract. In the light of these various considerations, it is our routine policy to investigate the biliary tract several weeks after the subsidence of acute pancreatitis, and to recommend the surgical correction of any pathologic condition remaining. On the other hand, we do not recommend primary or secondary operations on the biliary tract in the absence of demonstrable pathologic change.

As for patients who have recurring episodes of acute pancreatitis and no evidence of biliary calculi, it has been rationalized that the pathogenic mechanism of the common channel is nevertheless operative in many, the basic lesion being obstruction secondary to spasm of the sphincter of Oddi. On this basis sphincterectomy has been advocated for such patients. We have had insufficient personal experience with this form of treatment to draw any conclusions.

Knowledge of acute inflammatory disease of the pancreas is far from complete. Of first importance is elucidation of the

pathogenic mechanisms involved, and of the body's physiologic responses to the disease process. When this is achieved the relation between the two forms of pancreatitis will be established, diagnosis and prognosis will become more accurate, and new approaches to therapy will be provided.

SUMMARY

Since the development of a rapid and accurate method for estimation of the blood diastase level by Somogyi at the Jewish Hospital of St. Louis in 1937, acute pancreatitis has become widely recognized as a fairly common disease. Experiences in diagnosis, manifestations, complications and treatment of this disease, based on the management of over 200 cases and the performance of over 100,000 diastase determinations at the St. Louis Jewish Hospital since the advent of the Somogyi test, are discussed.

SUMARIO

Desde o desenvolvimento de um metodo rapido e acurado para avaliação do nivel de diastase sanguineo por Somogyi no Jewish Hospital de St. Louis em 1937, a pancreatite aguda se tornou largamente reconhecivel como uma doença relativamente comum. As experiencias de diagnostico, manifestações, complicaçoes é tratamento desta enfermidade, baseadas na observação de mais de 200 casos e na execução de mais de 10.000 determinações de diastase no St. Louis Jewish Hospital desde o advento do test de Somogyi são discutidas.

ZUSAMMENFASSUNG

Seitdem Somogyi vom Juedischen Krankenhaus in St. Louis im Jahre 1937 eine schnelle und zurverlaessige Methode zur Bestimmung des Diastasespiegels im Blut entwickelt hat, ist die akute Bauchspeicheldruesenentzuendung in weiten Kreisen als eine ziemlich haeufige Erkrankung anerkannt worden. Gestuetzt auf mehr als 200 behandelte Faelle und auf ueber 100 000 seit der Entdeckung der Somogyi-Probe im Juedischen Krankenhaus von St. Louis vorgenommenen Diastasebestimmungen eroertert der Verfasser die in der Erkennung der Krankheit gewonnenen Erfahrungen, ihre Symptome, Komplikationen und Therapie.

RESUMEN

La pancreatitis aguda ha sido reconocida ampliamente como una enfermedad perfectamente común, a partir del método para estimación exacta del nivel hemático de diastasa, que Somogyi desarrolló en el Hospital Judío de San Luis en 1937. Se discuten experiencias sobre diagnóstico, manifestaciones, complicaciones y tratamiento de esta enfermedad, basadas en la atención de más de 200 casos y más de 100,000 determinaciones de diastasa en el Hospital Judío de San Luis, desde el advenimiento de la prueba de Somogyi.

RIASSUNTO

Dacchè Somogyi ha messo a punto, al Jewish Hospital di St. Louis nel 1937, il suo metodo rapido e preciso di dosaggio della diastasi ematica, la pancreatite acuta è divenuta una malattia facilmente riconoscibile.

Vengono presentati i risultati di una esperienza personale sulla diagnosi, sintomatoligia, complicanze e cura della malattia, esperienza basata su oltre 200 casi e su oltre 10.000 determinazioni eseguite al St. Louis Jewish Hospital.

RÉSUMÉ

Depuis le développement rapide des nouvelles méthodes pour le diagnostic des niveaux diastoliques de Somogyi à l'Hôpital Juif de St-Louis en 1937, la pancréatite aigue est devenue une maladie commune. L'expérience du diagnostic, les manifestations, les complications et les traitements de cette maladie, basés sur 200 cas et sur une étude de 100,000 cas à l'Hôpital Juif de St-Louis, est résumée.

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Angulation and Rotation Osteotomy

A Nonshortening, Nondisplaceable, Telescoping, Impaction Type of Osteotomy

HARVEY E. BILLIG JR., M.D., F.I.C.S.
LOS ANGELES

THE chronologic list of palliative surgical procedures to correct anatomic defects in the alignment of bones and joints dates back to antiquity. However, because of the extreme danger of a dreaded bone infection, it is only since the advent of aseptic technics that surgeons have dared to tackle a "clean" case in order to change a bone contour to correct a deformity. Even so, the hazard in bone surgery with its subsequent osteomyelitis, so difficult to control, influenced many orthopedists to hesitate. It was not until recent years, with the advent of antibiotics and other antibacterial agents, that the surgeon has really felt free to explore uninhibitedly and to develop and adopt open corrective skeletal operations.

Presented in this paper is a practical orthopedic operation of wide usefulness by which accurate, nondisplaceable angular and rotation osteotomy may be obtained without loss of length or the use of pins, wires or internal fixation. Osteotomy performed by this method prevents the interposition of muscular or connective tissue or the growth of interposing fibrous tissue (including fibrous union) and utilizes all the qualities of an impacted fracture for advantageous bony union.

Mechanically speaking, bones have a hard, firm outer surface with a softer center, resembling a pipe in the long bones and two separated plates in the flat bones. The first appreciation of the mechanical potentialities of this situation for use in correction of angular bone deformities by means of impaction osteotomy rightfully belongs to Ogston, who reported "a new principle in curing clubfoot" in the *British Medical Journal* of June 21, 1902. Ogston prepared a bed in the desired bones and then proceeded to crush the cortex together in telescoping impaction style.

Utilizing the principles of impaction and telescoping, the technic encompasses progressive increased gradation of the amount of telescoping impaction from base to tip of a predetermined oblique osteotomy line. The oblique osteotomy line is so slanted that the angled tip of the internally telescoping fragment is pointed toward the nearest joint in order to take every advantage of the widening bone for the encompassing sleeve fragment. At the base of the oblique osteotomy line (on the opposite side of the bone from the maximum telescoping tip) a portion of the cortex is left unaltered. The osteotomy is performed by slanting the osteotome along the oblique osteotomy line in an undercutting direction (toward the potential sleeve fragment). The slanting undercut-

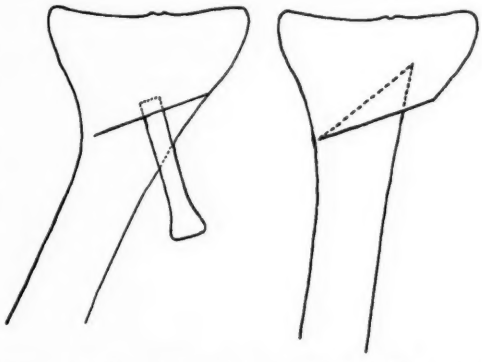

Fig. 1.—Tip telescoped into encompassing fragment, in which bed has already been prepared.

From the Billig Clinic, Los Angeles.
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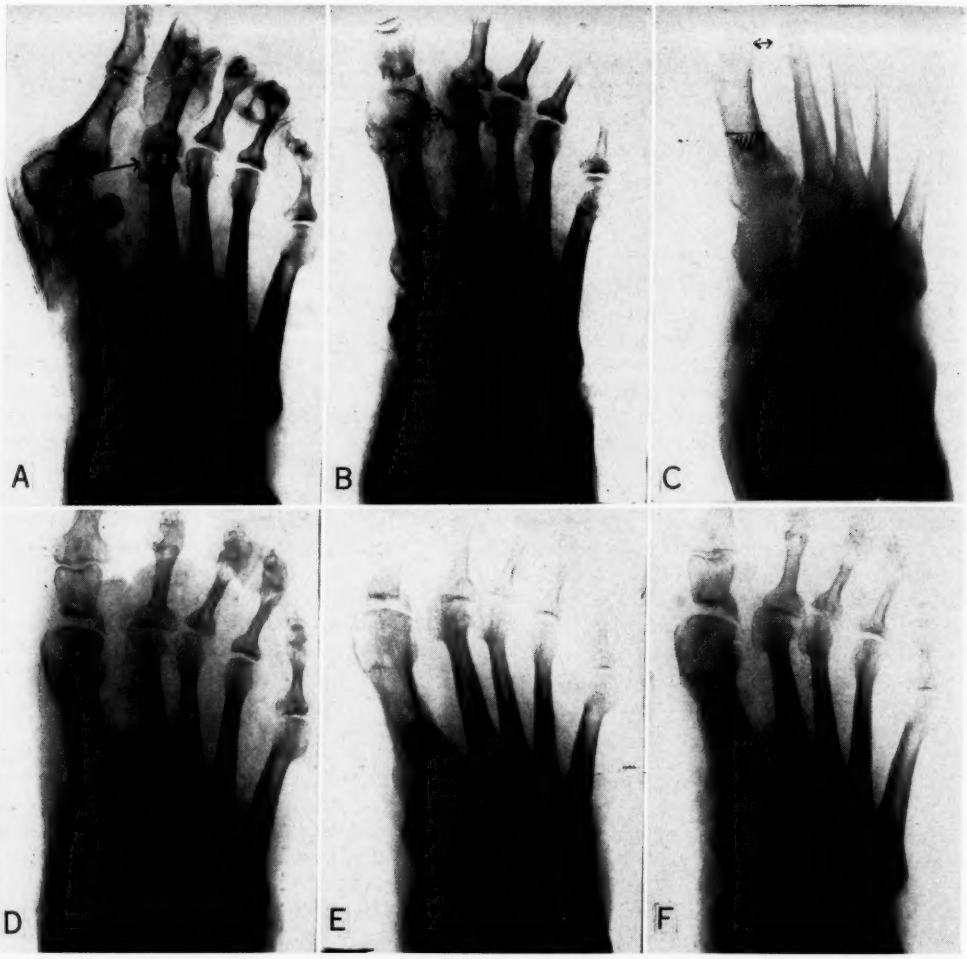

Fig. 2.—Series of successive roentgenograms from May 15, 1945 to Jan. 2, 1946. *A*, taken on the first of these dates is a preoperative view; the others are postoperative. *B*, July 13, 1945; *C*, Sept. 5, 1945; *D*, Oct. 1, 1945; *E*, Oct. 19, 1945, and *F*, Jan. 1, 1946.

ting is carried out sufficiently to allow the telescoping fragment to "angle over," the portion of cortex left intact being used as a base, with an increased telescoping as the tip is reached. After preparation of the bed, the bone is manually angled gently so as to telescope the tip into the encompassing fragment in which the bed has been prepared (Fig. 1). When this has been carried out, the remaining intact cortex at the base will break or bend in the manner of a greenstick fracture, allowing the angular impaction fragment to telescope and reach the correcting degree of bony angulation desired. The amount and direction, clockwise or counterclockwise, of undercutting determines the amount of lateral and rotation correction obtained. Subsequent mutual lateral or torsion displacement of the osteotomy is prevented by the telescoping impaction. The length of the bone *in toto* remains the same as

measured along the base of the osteotomy. Plaster of paris immobilization after suture of the wound is used to maintain the lateral and rotatory corrected position. If, after postoperative roentgenograms are taken, it is decided to change the degree of angular osteotomy, corrective half-moon wedges taken out of the plaster will accomplish this without fear of lateral or rotatory displacement of the osteotomy. It is well to remember that plaster fixation of at least one joint above and below the osteotomy site is essential. Healing in this type of osteotomy is remarkably rapid because of the impaction apposition position and the effective telescoping immobilization.

I have performed this operation repeatedly since 1938 on a variety of bones in order to change their angular and torsion contours (Fig. 2).

In practice one is confronted with many conditions in which this osteotomy can be used to realign bones for improvement of function. These include malunion of fractures, gènu valgum and varum, metatarsus primus varus, developmental and congenital deformities, irreducible congenital dislocation of the hip, torsion deformities, incorrect angle following arthrodesis, irreducible joint contractures, recurrent dislocation of the patella, deviation of the bony contour resulting from aberrant epiphysial growth, genu recurvatum, coxa vara, Madelung's deformity, anteversion of the neck of the femur and cubitus varus.

SUMMARY

1. A practical, nonshortening, nondisplaceable angular and rotation telescoping impaction orthopedic osteotomy is described.

2. The advantages of the operation and its field of usefulness are summarized.

SUMARIO

1. E descrita um osteotomia ortopedica pratica, não produtora de encurtamento, não deslocavel, angular e de rotação telescopica por choque.

2. As vantagens da operação e seu campo de uso são sumarizados.

ZUSAMMENFASSUNG

1. Es wird eine praktische, winklige und rotierende, die Fragmente teleskopartig einschiebende, orthopaedische Osteotomie, die nicht zur Verkuerzung fuehrt und unverschiebbar ist, beschrieben.

2. Die Vorzuege und Anwendungsgebiete der Operation werden zusammengefasst.

RÉSUMÉ

L'auteur décrit un procédé d'ostéotomie pratique qui ne cause aucun raccourcissement, ne bouge pas, peut se mouvoir facilement:—2o en énumère aussi les avantages.

RESUMEN

1. Se describe una osteotomía ortopédica práctica, sin acortamiento, sin desplazamiento angular, rotación y telescopiamiento.

2. Se resumen las ventajas de la operación y su utilidad.

RIASSUNTO

1) Viene descritta una osteotomia che è pratica, non accorciante, non spostabile ad angolo e rotazione telescopica.

2) Vengono riassunti i vantaggi dell'intervento e il suo campo di applicazione.

Division of the Spermatic Cord as an Aid in the Repair of Recurrent and Other Difficult Inguinal Hernias

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HIGH and low recurrence rates after repair of inguinal hernia have been reported, affording a topic of considerable discussion in the literature. In a single series of cases, any figures on the rate of recurrence of inguinal hernia must be interpreted with caution, because it has been observed that many patients requiring secondary repair change physicians, hospitals or even cities, with the result that complete and accurate follow-up study over a long period is almost impossible. As an example, of the 27 herniоplasties done previously in 26 operations on 16 patients included in this paper, 13 repairs were done at other hospitals and 22 were done by other surgeons; 2 patients made these changes more than once. Perhaps a better index of the rate of recurrence is the percentage of recurrent hernias of the total number of inguinal hernias repaired at the average general hospital. With the Jewish Hospital as an example, about 9 per cent of the operations performed for inguinal hernia in adults in the last seven years were performed for recurrences. Perhaps this figure is lower than the actual rate, because some patients are reluctant to have a second operation after failure of the first.

Figures on recurrence rates for recurrent and other difficult hernias must also be interpreted with caution. However, it is reasonably certain that the percentage of recurrence is much higher for inguinal hernia in these categories than for primary simple hernia. Rates between 15 and 50 per cent have been reported for recurrent hernias[1] and for sliding hernias.[2] As a result of our concern for patients with these and other difficult types of hernia, we have adopted in selected cases the technic of division of the spermatic cord, leaving the testis *in situ*, as an aid in repair. This technic, first described by Burdick and Higginbotham[3] in 1935, has evolved out of the need to correct the inherent defect in all standard, primary operations for inguinal hernia. This defect is the necessity for leaving an opening in the repaired tissues to allow for the emergence of the spermatic cord. The other method of closing the opening involves, of course, removal of the testis, but we have not employed this method, because it adds to the technical problems and especially because the human male of all ages is reluctant to part with testicular tissue.

Burdick and Higginbotham described the results of repair of 200 inguinal hernias of various types, including 59 recurrent ones, with the aid of complete division of the cord. Thirty-three wounds (17.5 per cent) became infected, and necrosis of the testis in 4 cases necessitated orchiectomy. There were 6 postoperative deaths. Follow-up examinations were obtained in 169 cases. Eleven of these showed slight atrophy of the testis and 11 others atrophy to one-half the normal size or less. Twenty hernias (14 in the recurrent group) recurred. Many of these hernias were repaired with autogenous fascial sutures, or fascia, or catgut of large caliber. Antibiotics were not in use.

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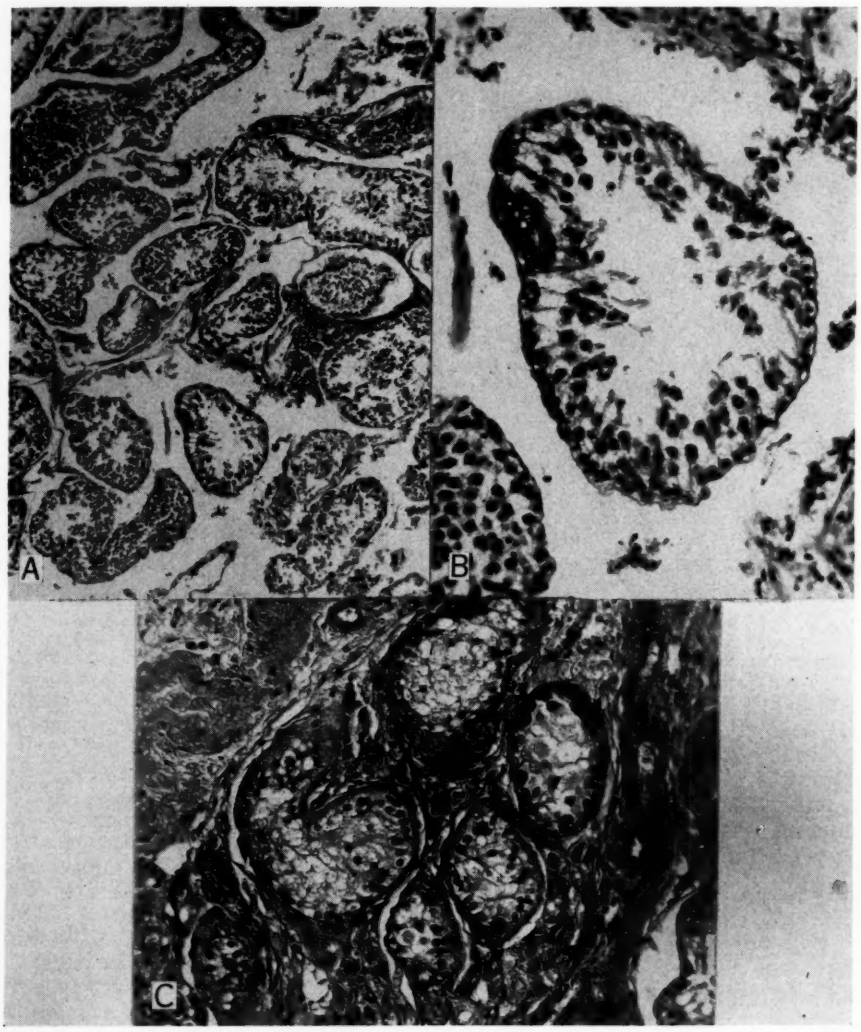

Fig. 1 (Dog 1).—Preoperative biopsy of right testis. Sperm cells in various stages of maturation are present. Mature sperm are not viable in these sections, but were present. *A*, × 75; *B*, × 260. *C* (× 175), same testis three months after complete division of right spermatic cord. Central tubules shown. Note decrease in size of tubules and in number of spermatic cells, which are replaced by large, foamy polygonal cells.

The conditions were not as favorable for good results as they are today.

Neuhof and Mencher,[4] reporting on 19 selected cases of similar repair stated that there were 2 recurrences and 6 cases of testicular atrophy. They reviewed earlier experimental work on the effect of division of the various components of the spermatic cord on the testis, and described the arterial anastomotic system which maintains the viability of the testis after the cord is divided in man.

Since the clinical results of these reports indicated that complete severance of the spermatic cord could be performed without producing gangrene and usually

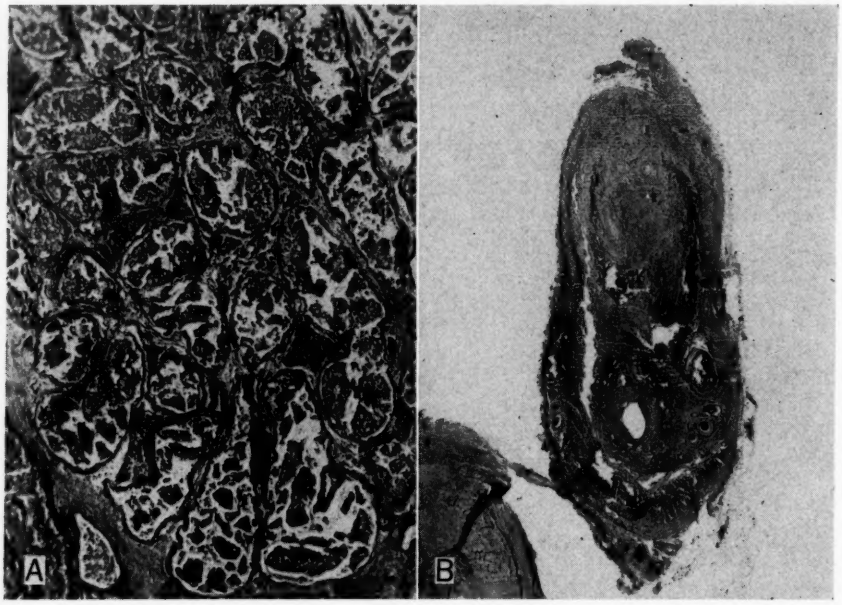

Fig. 2 (Dog 2).—*A*, right testis (× 75) one month after complete high division of spermatic cord. Note dilatation and distortion of tubules, separation of sperm-producing cells from basement membrane, and altered cellular morphologic pattern. *B*, left testis (× 14) one month after low division of spermatic cord, with preservation of ductus deferens and deferential artery. The complete hyalinized organ is shown here.

without even producing atrophy of the testis, it occurred to us that, if only the ductus deferens were preserved, complete function of the testis might be maintained. In other words, if testicular function and size could be preserved after the spermatic cord, except for the ductus deferens, was divided, we hoped that the routine primary hernia operation could be done in a way that would leave only a 3 or 4 mm. opening for the exit of the ductus, an opening hardly larger than the space between two interrupted sutures and not large enough to predispose to recurrence. Accordingly, the following experiments in dogs were performed to determine the effect on the testis of (a) complete division of the spermatic cord; (b) division of the spermatic cord except for the ductus deferens and the deferential artery, and (c) high, middle or low placement of these divisions.

—DOG EXPERIMENTS

Methods. Five mongrel, male adult dogs, weighing from 16 to 38 pounds (7.2 to 17.2 Kg.) were anesthetized with intravenous pentabarbital sodium, 0.5 Gm. of a 10 per cent solution for each kilogram of body weight. The regions of the testes and spermatic cords were prepared for operation in the routine fashion. It was found that access to both testes and both spermatic cords could be obtained through a single midline incision by displacing these organs into the incision and dividing the overlying fascial envelopment.

A small scalpel control biopsy specimen for microscopic examination was obtained from each testis after preliminary insertion of a hemostatic mattress suture of fine silk. The testis was then replaced, and the spermatic cord was delivered into the wound and cleaned of external spermatic and cremaster fascia for the required transection. After division of the cord structures the ends were secured with transfixion ligatures of No. 0000 silk. The cord was replaced, and the divided layers of

fascia and skin were sutured with interrupted No. 0000 silk. Dressings were not applied.

The dogs were boarded for about three months and were then killed, after which the testes were removed for study. In those instances in which they became atrophic they were sometimes hard to locate, but usually nubbins of scarred testes could be found at the proper anatomic sites.

RESULTS

Dog 1: Black mongrel weighing 17.3 Kg. Right side: division of entire spermatic cord at level of pampiniform plexus (low division). Left side: division of entire spermatic cord at subcutaneous inguinal ring (middle division). Both control biopsies showed normal testicular tissue. The tubules were composed of normal sperm-producing cells in various stages of maturity, spermatogonia and spermatocytes with and without mitoses, spermatids and spermia (Fig. 1, *A* and *B*). Three months after division of the cords the two testes were grossly about the previous size. Microscopically, the tunica was thickened and there was appreciable loss of tubules in the peripheral area. As one approached the center of the organ the tubular outlines remained, but they were smaller and the sperm-producing cells were mostly replaced by large foamy, polygonal cells, some containing pigment, apparently a degenerative manifestation (Fig. 1*C*). The center of the gland contained fairly normal tubules. Except for the presence of more pigment, the left testis showed a picture similar to that observed in the right.

Dog 2: Black and white short-haired mongrel weighing 11.8 Kg. Right side: Division of entire spermatic cord at deep inguinal ring (high division). Left side: Division of spermatic cord at pampiniform plexus, preserving ductus deferens and its artery. The control testicular biopsies were similar microscopically to those of Dog 1. One month after the operation the animal died of distemper. The right testis was almost normal in size. Microscopically, there was interstitial fibrosis; the tubular outlines were well preserved, although the basement membranes were irregular. The sperm-producing cells had largely separated from the basement membranes and arranged themselves as irregular clumps within the tubular lumens (Fig. 2*A*). We were unable to classify the tubular cells because of the altered cellular morphologic picture. A few mature sperm were seen. The left testis was completely atrophic, being replaced by hyalinized connective tissue (Fig. 2*B*).

Dog 3: Short-haired brown mongrel weighing 8.2 Kg. This experiment was a repetition of that performed on Dog 2. Dog 3 survived for the required three months, after which the testes were removed. Both control biopsies showed normal testicular tissue. The right testis was grossly about three-fourths normal size. Microscopically, there was thickening of the tunica, and the peripheral tubules showed the changes described in Fig. 2*A*. The central tubules were somewhat enlarged and were almost filled with viable-looking sperm-producing cells, which we could not classify (Fig. 3). The left testis, with its ductus preserved, was completely atrophied and replaced by hyalinized connective tissue as in Fig 2*B*.

Dog 4: Long-haired black and white mongrel weighing 7.3 Kg. Right side: Division of spermatic cord at level of subcutaneous inguinal ring, with preservation of ductus deferens and its artery. Left side: Same as right, except that division was made at level of deep inguinal ring. The control biopsies were normal. After three months the right testis was represented by a nubbin of tissue a tenth its previous size. Microscopically, no tubules were recognizable. The periphery of the testis was replaced by fibrous tissue, while the central area contained large polygonal vacuoloted cells (Fig. 3B). The left testis had so atrophied that there was neither gross nor microscopic evidence of it.

Dog 5: Brown terrier weighing 3.6 Kg. Right side: Resection of all the structures of the spermatic cord lying within the inguinal canal. Left side: Same as on right, except that the ductus deferens and its artery were preserved. The control biopsies were normal. Three months later the right testis had atrophied to 8 mm. in diameter, structurally similar to Fig 4. The left testis was an ovoid nubbin of hyalinized connective tissue (Fig. 3C).

CONCLUSIONS

These experiments indicate that when the entire spermatic cord is transected in the dog, the testis, after three months, undergoes some change regardless of the level of ligation, but does not atrophy. Microscopically, the major degenerative changes occur in the periphery of the

gland, where the tubules are replaced by polygonal cells containing blood pigment. Sperm-producing cells remain in the central tubules. These changes are probably the result of circulatory insufficiency and congestion associated with interruption of the blood flow. Paradoxically, when the ductus deferens and its artery are preserved, division of the cord at any level or resection of it within the inguinal canal results in complete atrophy of the testis. It is noteworthy that these ligations and resections do not result in gangrene of the testis.

The reason for these paradoxic results is not apparent. Similar results were obtained in dogs by Wangensteen[5] when he preserved the deferential artery. His experiments also did not produce gangrene of the testis, except when infection supervened. Moschkowitz[6] described the appearance of the testis four days to three weeks after he transected the spermatic cord in dogs, and noted congestive vascular changes but no gangrene.

From these dog experiments it may be concluded that complete division of the spermatic cord can be done without producing gangrene, but not without some alteration of testicular structure. These experiments shed no light on the loss or preservation of the internal and external secretion of the testis. If the ductus deferens and its artery are spared, atrophy of the testis results and the external secretion of the organ cannot be preserved. Accordingly, the results of these dog experiments are discouraging to our hope that primary hernia repair can be done in a way that would leave an opening as small as the diameter of the ductus deferens.

Whether the conclusions from these experiments on dogs can be carried over to man is open to doubt. Although it has been stated that the blood supply to the testis of the dog closely resembles that of man, the results of animal experiments have been frequently at variance with clinical observations. It will be shown below that in 2 of our cases (Cases 11 and 14), in which the patients had their ducti preserved while the other cord structures were divided, the testes remained grossly normal; and in 1 of these (the patient in Case 11) the external secretion contained viable sperm.

CLINICAL EXPERIENCE WITH DIVISION OF THE SPERMATIC CORD

Experience at the Jewish Hospital with division of the spermatic cord as an aid in the repair of inguinal hernia dates back to 1935, when the procedure was carried out for an indirect hernia that had twice recurred (Case 1). The operation was not again employed until ten years later. At the present writing, 20 patients have had this aid in the repair of 23 inguinal hernias. Their cases are reviewed in the accompanying table.

The patients ranged in age from 30 to 68, the average age being 50. Thirteen hernias were on the right side, 4 on the left and 3 bilateral. Eighteen hernias were indirect, 2 (those in Cases 5 and 11) direct, and 3 (those in Cases 8, 19 and 20) sliding. Of the indirect hernias, 2 (those in Cases 10 and 14) were irreducible, and 1 (that in Case 9) strangulated.

The 20 patients had undergone 27 previous hernioplasties. In 7 the hernia recurred in less than three months; in 7, between three and six months; in 6, between six and twelve months and in 2, between twelve and eighteen months. Five other hernias recurred between three and twenty-one years after the operation, and it cannot be stated whether these were true recurrences or new hernias.

Five of the cases are worthy of special mention. In Case 5 a right direct inguinal hernioplasty with transplantation of the spermatic cord was performed in February 1946, after which a postoperative wound infection occurred. Several weeks later a recurrence was noted at the site of the new subcutaneous ring. In September 1946 hernioplasty was again performed and a large indirect sac was found. A solid repair was effected after division of the spermatic cord, and again the operation was complicated by a post-

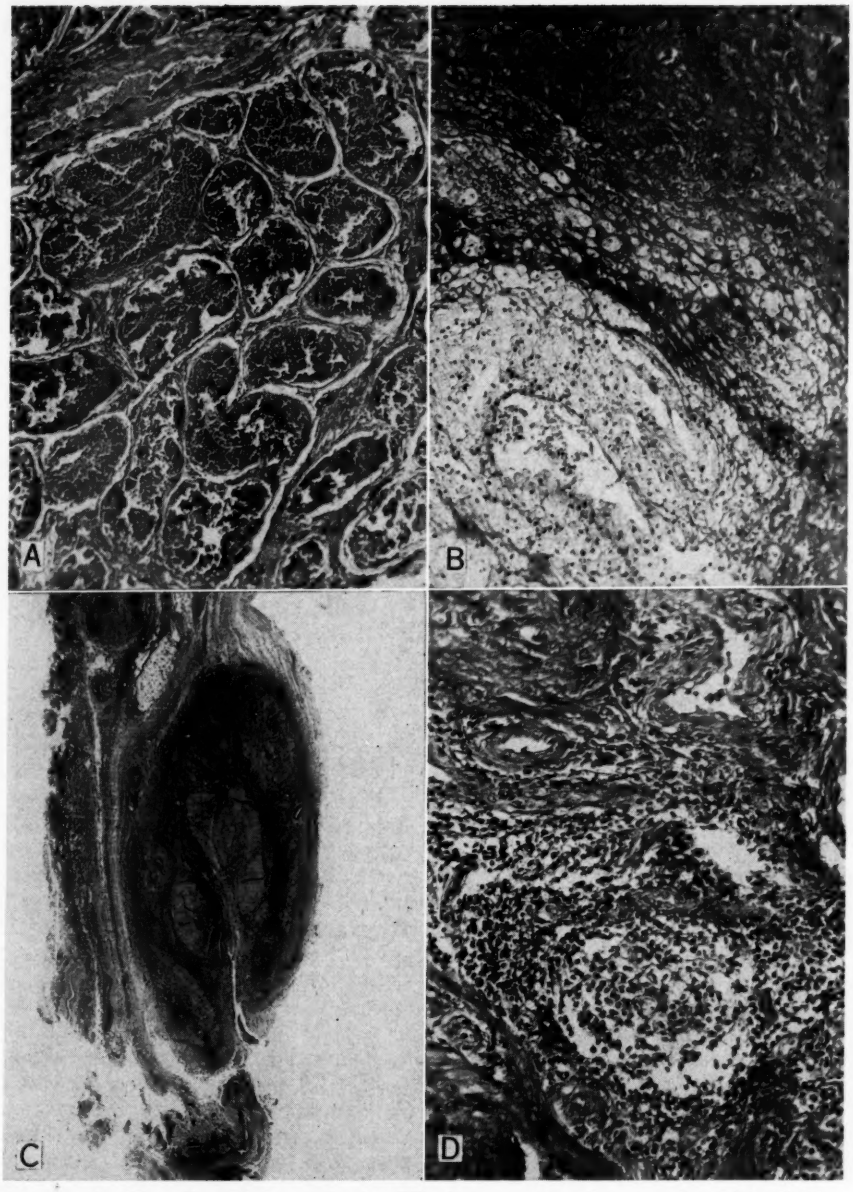

Fig. 3.—*A*, (Dog 3).—Right testis (× 75) three months after complete high division of spermatic cord. Dilated, distorted tubules are packed with viable sperm-producing cells of uncertain classification. *B* (Dog 4), right testis (× 100) three months after middle division of spermatic cord, with preservation of ductus deferens and deferential artery. Transition between peripheral hyalinized (dark) tissue and the central (light) area containing foamy polygonal cells is shown. Note complete absence of tubules. *C* (Dog 5), left testis (× 10) three months after resection of spermatic cord lying within the inguinal canal, with preservation of ductus deferens and deferential artery. The entire hyalinized organ is shown. *D*, testis of patient in Case 5 (× 165) removed sixteen months after division of spermatic cord followed by wound infection and suppuration. Note absence of tubules. Testis is replaced by fibrous tissue and clusters of lymphocytic cells.

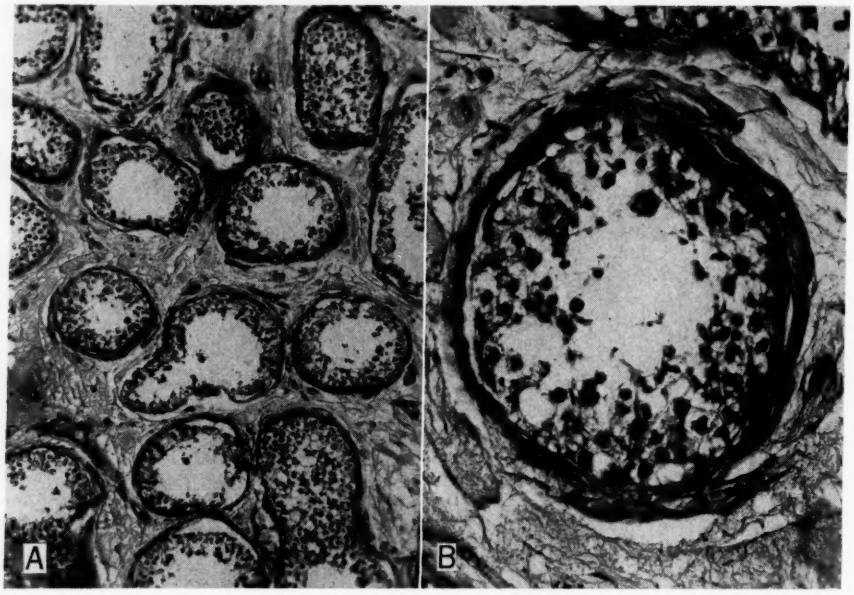

Fig. 4.—Testis of patient in Case 3 two years after division of spermatic cord. Except for decreased density of spermatic cells, structure is fairly normal. *A*, × 75; *B*, × 260.

operative wound infection. The testis became infected, and scrotal suppuration occurred. Owing to chronic infection and a persistent sinus tract, the testis, which remained one and a half times the normal size, was finally removed in January 1948. The hernia did not recur. Microscopic section of the specimen revealed dense connective tissue at the periphery, interlaced with fibroblastic proliferation and lymphocytic infiltration. Although the stromal and acinar patterns were occasionally preserved, the glandular elements were all necrotic (Fig. 3*C*).

This case illustrates the need of preventing postoperative infection if the testis is to remain viable. The testis cannot withstand the impact of infection superimposed upon the impairment of circulation incident to division of the cord.

The patient in Case 3 had a right indirect inguinal hernioplasty in 1940, the repair being effected with the aid of autogenous fascial strips. On leaving the hospital two weeks later he was struck by an automobile and a recurrence was noted. In 1946, after an episode of incarceration, hernioplasty was carried out, with complete division of the spermatic cord. The hernia did not recur. Three years later the patient died of myocardial infarction. The right testis was removed at postmortem examination; grossly it was only slightly atrophic, and microscopically it showed fairly normal testicular structure (Fig. 4*A* and *B*).

In Case 4 bilateral indirect hernioplasties were performed in 1915. In 1945 both hernias were again repaired, this time with transplantation of the cords. Several months later the right side showed another recurrence. In April 1946 a repair was again carried out, with severance of the right spermatic cord. After initial postoperative swelling, the testis returned to the preoperative size. In March 1947, a hydrocele of the right tunica vaginalis testis was observed. This persisted despite several aspirations. Partly because of our curiosity and partly because the size of the organ annoyed the patient, the testis was excised in Novem-

ber 1947; both gross and microscopic examination revealed it to be entirely normal (Fig. 5*A* and *B*).

Cases 3 and 4 present unmistakable evidence that, despite complete division of the spermatic cord, there was sufficient flow through collateral channels to maintain the normal testicular architecture for twenty-seven and ten months, respectively. Neuhof and Mencher had described a similar result in a 20-year-old patient. Since both of our patients were in their fifties, it is obvious that the result is not necessarily dependent on the youth of the patient.

In Case 11 bilateral inguinal hernioplasties were performed for large indirect hernias. On the right side the entire cord was transected; on the left side the ductus deferens and the deferential artery were preserved, the remaining structures of the cord being divided. Contrary to what we had expected from the results of our dog experiments, there was no difference in the postoperative course between the two testes, both remaining the same size as before the operation. The most notable feature, however, was that the postoperation ejaculant contained viable spermatozoa, although the sperm count was only 50,000.

In Case 14 the patient had a hernioplasty with division of the spermatic cord, but with preservation of the ductus deferens and its artery. Here also there was no demonstrable gross difference in the testicular reaction between this and the other cases.

Cases 11 and 14 indicate that in man, as contrasted to the dog, it is possible to retain the normal testis both anatomically and functionally if the ductus deferens and the deferential artery are preserved when the remaining cord structures are transected. This indicates that anatomic differences in the collateral circulation exist between man and the dog.

The recovery of spermatozoa from the ejaculant in Case 11 suggests that it may be possible, after dividing the cord and preserving the ductus, to maintain procreative function. Perhaps the hypothesis that caused us to embark upon the dog experiments may yet prove to be valid. Thus, the patient who is reluctant to have his spermatic cord divided because of the abolition of spermatogenesis, may permit transection if he knows that this function will be preserved when the ductus and its artery are spared.

OPERATIVE TECHNIC

It cannot be too strongly emphasized that division of the spermatic cord is not a method of repairing an inguinal hernia. To consider it a substitute for any of the standard procedures employed in doing a good hernioplasty is to court failure, even disaster. A detailed and accurate knowledge of the anatomic and phyiologic character of the inguinal region, together with a thorough grounding in the principles of hernia repair, is essential before one considers whether or not one should divide the cord. If it is then decided that leaving a passageway for the spermatic cord may jeopardize the cure, the cord may be transected. Permission should be obtained in advance.

In our experience, the patients in greatest need of this technical aid are those with recurrent indirect hernia. Some patients with large indirect hernias or sliding hernias and some who have direct hernias with deficient surrounding tissue may also be benefited.

We are not partial to any one special technic of hernia repair. We use modifications of and improvisations on standard procedures to meet the needs of varying anatomic conditions. Therefore we did not record the procedures used for our patients, because that would involve giving a detailed operative report of each of the 23 repairs. In general, we lay much stress on repairing and strengthening the transversalis fascia, suturing fascia to fascia, delineating clearly the anatomic structures, avoiding tension, using nonabsorbable suture materials, and shunning mass sutures. Since the viability of the testis

after division of the cord depends largely upon the prevention of infection, gentle handling of tissues is required; meticulous hemostasis must be secured and rigid asepsis maintained. (The loss of the testis in Case 5 probably resulted from failure to observe these principles). As an additional safeguard against infection, antibiotics are now used in the post operative period.

In 16 hernias, that portion of the spermatic cord and its covering of cremasteric fascia which lay within the inguinal canal was excised. We were careful not to make the division too low, for fear of interferring with collateral circulation. The cord was usually subdivided into several different structures, and each structure was individually transfixed and ligated with No. 000 braided silk. In this way the proximal and distal cord stumps were not in the way of closing the inguinal rings. In 5 hernias the cord structures were transected and ligated without resection of the part within the canal, and the stumps were displaced outside the inguinal canal. In two hernias the cord structures were transected (Cases 11 and 14), but the ductus deferens and its artery were preserved, the repair leaving enough opening to allow for the exit of the ductus, which was transplanted above the external oblique aponeurosis. This last technic, as has been mentioned, was employed for comparison with the results obtained in the dog.

Scrotal suspensories were applied after each operation, and their use was continued until the swelling and pain subsided.

RESULTS

The Wounds.—Except for the wound in Case 5, in which infection eventually caused the loss of the testis, all the wounds healed by primary union.

The Testis.—After division of the cord by one of the methods aforedescribed, 17 of the 23 testes became swollen one and a half to three times the preoperative size. The maximum swelling occurred one to eight days after the operation. The swelling was usually slow to subside, in no instance taking less than two weeks, and in 2 patients requiring ten weeks. The testis in Case 5 remained swollen because of chronic infection until its removal after sixteen months. Six testes had no demonstrable postoperative swelling, and this absence of swelling could not be attributed to the type of operation performed.

On the last visit the testis of each patient was examined for position, size and sensitivity. In 2 instances (Cases 3 and 12) the testes were found to ride high in the scrotum, and in 2 others (Cases 11 and 20) the organs were in the mid-scrotum. In the remaining cases the testes were found in the normal low position. Only 4 testes showed any degree of atrophy. The testes in Cases 9 and 11 could be considered slightly atrophic, measuring only three-fourths the preoperative size. Those in Cases 3 and 12 were definitely atrophied, measuring two-thirds and one-fourth, respectively, of the preoperative size; these were the 2 testes which ended up in high scrotal positions. Two testes (in Cases 2 and 20) remained larger than their preoperative size but were not hypersensitive.

Two of the 23 testes were eventually removed: 1 in Case 4 after nineteen months, for hydrocele, and the other in Case 5 after two years, for chronic infection. These were the only additional operations needed among the 20 patients. Instead of removing the testis in Case 4, it was necessary only to do a hydroelectomy, but our interest in examining the complete organ influenced the choice of operation.

Slightly increased sensitivity of 2 testes was observed. The chronically inflamed testis remained tender. The remaining organs retained normal sensitivity.

The Hernia.—Follow-up examinations of all 20 patients were obtained for periods varying from five to one hundred and eight months. None of the hernias had recurred at the last examination. Since some hernias have been known to recur years after the original repair, the absence of recurrence now does not guar-

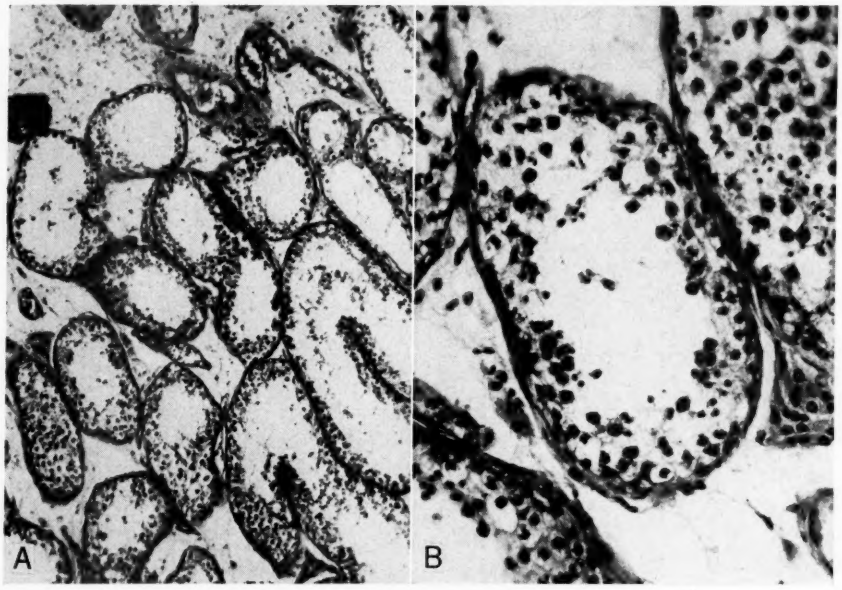

Fig. 5.—Testis of patient in Case 4, nineteen months after division of spermatic cord and eight months after appearance of hydrocele. Tubules are structurally normal. *A*, × 75; *B*, × 300.

antee permanent cure. It has been observed that about 80 per cent of recurrences are noted within the first year after the operation.[7] In our group of patients, 20 of the 27 recurrent hernias appeared during the first year. Nineteen of the 23 hernias repaired with the aid of division of the spermatic cord have been observed longer than a year. Accordingly, a very low recurrence rate should result. Although operations without division of the spermatic cord were not performed in a comparable series of hernias, we are probably justified in concluding that division of the spermatic cord was at least partly responsible for the absence of recurrence in our cases. Of some importance, too, was the fact that we were able to achieve these satisfactory results while preserving the gross structure of the testis in all cases but one (Case 5). In the 2 patients (those in Cases 3 and 4) who afforded us the opportunity to examine the organ microscopically, the histologic structure also was fairly normal. We still harbor the hope, based on our experience in Cases 11 and 14, that normal testicular structure as well as sperm production can be maintained in those cases in which the ductus deferens and its artery are preserved after division of the spermatic cord.

SUMMARY

1. In the dog, division of the spermatic cord at various levels within the inguinal canal did not produce gangrene or necrosis of the testis, although some degeneration of the tubules and spermatic cells was produced. Paradoxically, when the ductus deferens and its artery were preserved after division of the rest of the cord structures, the testis atrophied completely.

2. In man, division of the spermatic cord within the inguinal canal usually produced moderate swelling of the testis in the immediate postoperative period, but after a few weeks the organ usually returned to its preoperative size. Micro-

Division of Spermatic Cord—Data on 20 Cases

Case No.	Age* of Patient	PAST HISTORY						PRESENT OPERATION							RESULTS				Comment
				Previous Repairs								Postoperative Testicular Swelling			Testis				
		Side	Date of Onset	When	Jewish Hospital	Same Surgeon	Date of Recurrence	Reason Cord Divided	When Done	Type of Hernia	** Procedure	*** Maximum Size	Post op. Day Greatest	When Subsided* Weeks	Position	*** Size	Sensitivity	Last Follow-up* Months after Operation	
1	63	L	1931	1931	No	No	1931	R	1935	I	2		None		N	N	N	108	
			1931	1931	No	No	1931												
2	30	R	1941	1941	Yes	No	1942	R	1944	I	1	2x	1	2	N	1½x	N	46	
			1944	1944	Yes	No	1944												
3	53	R	1944	1915	No	No	1932	R	Feb. 46	I	1	2x	5	2½	H	⅔	N	24	Died of myocardial infarction 27 months after surgery operation; testis grossly and microscopically normal (Fig. 7)
			1932	Feb. 40	Yes	Yes	Mar. 40												
4	56	R	1911	1913	No	No	1944	R	Apr. 46	I	2	1½x	6	4	N	N	N	69	Hydrocele noticed March 1947; orchiectomy for hydrocele Nov. 1947. Testis grossly and microscopically normal (Fig. 8)
			1944	Oct. 45	Yes	Yes	Apr. 46												
5	60	R	1942	1946	Yes	No	1946	Large	Feb. 46	D	1	1½x	1	16	N	1½x	***	40	Postoperative wound infection. Testis swollen and tender until removal after 16 months (Fig. 6)
6	68	L	1923	1923	Yes	No	1923	R	May 47	I	2		None		N	N	N	46	
				1947			Apr. 47												
		R	1946	1946	Yes	No	1946	R	May 47	I	1		None		N	N	*	46	
				1946															
7	60	R	1943	N	o	r	e	Large Irreducible	Dec. 47	I	1	2x	3	4	N	N	*	49	
8	65	L	1942	N	o	r	e	Sliding	Dec. 47	SI	2	3x	7	10	N	N	N	49	
9	46	R	1938	1938	No	No	May 48	R	Sep. 48	StI	1	2x	5	6	N	¾	N	39	Strangulation of small intestinal loop 4 hours, not gangrenous
10	58	R	1940	Jun.47	Yes	No	Jul. 47	R	Dec. 48	IrI	1	1½x	4	2	N	N	N	37	
11	58	L	1923	N	o	r	e	Experimental	Dec. 48	D	3	1½x	3	2	M	N	N	29	Ductus deferens and artery preserved on left side: cords otherwise divided. Postoperative ejaculant contained spermatozoa
		R	1936							I	1	1½x	3	2	N	N	N		
12	64	R	1938	N	o	r	e	Large	Dec. 48	I	1	3x	8	4	H	¼	N	37	
13	62	R	1932	Feb. 49	Yes	Yes	Apr. 49	R	Jul. 49	I	1		None		N	N	N	30	Bilateral femoral hernias also repaired at same Feb. 49 operation. Recurrences through new canals for transplanted cords
		L	1933	Feb. 49	Yes	Yes	Feb. 50	R	Aug. 51	I	1		None		N	N	N	5	

																						Preservation of ductus and artery after division of cord did not cause testicular atrophy
14	30	R	1941	1941	No	No	1944	R	Oct. 49	IrI	3	1½x	1	2	N	N	N	20				
15	43	L	1932	1933	No	No	1934	R	Jul. 50	I	1	1½x	4	3	N	N	N	18				
16	49	R	1941	1942	No	No	1942	R	Aug. 50	I	1	2x	3	5	N	N	N	17				
			1942	1944	No	No	1944															
			1934	1934	No	No	1935															
17	53	R	1935	May 47	No	No	Jun. 47	R	Aug. 50	I	1	1½x	4	10	N	¾	N	17				
			Jun. 47	Jun. 48	No	No	Aug. 48															
18	64	R	1944	1944	No	No	1944	R	Feb. 51	I	2	2x	3	5	N	N	N	11				
19	56	L	1934	1934	Yes	Yes	Mar. 51	R Sliding	Apr. 51	SI	1		None		N	N	N	9				
20	54	R	1927	1927	Yes	No	1928	Large Sliding	Jan. 51	SI	1	3x	5	5	N	1½x	N	12				

Key to table
* At last operation
**Procedure:
1. Resection of cord within inguinal canal
2. Transection of cord in inguinal canal
3. Transection of cord except ductus deferens and artery
***Compared with preoperative size

R = Recurrence
I = Indirect
SI = Sliding indirect
StI = Strangulated indirect
IrI = Irreducible indirect
D = Direct
N = Normal
H = High scrotal
M = Mid scrotal

scopic study of two of these testes showed essentially normal tissue.

3. In contrast to the dog, when the ductus deferens and its artery were preserved after division of the rest of the cord structures in 2 patients, the testes remained grossly normal. In 1 of these patients the ejaculant contained viable spermatozoa, although the ductus on the opposite side was divided.

4. Twenty-three hernias of the recurrent, sliding and large indirect types in 20 patients were repaired with the aid of division of the spermatic cord. One testis was lost owing to infection and 1 was removed because of the development of a hydrocele. Two testes became moderately atrophic, 2 very slightly atrophic, and 2 slightly hypertrophic. The other testes remained normal.

5. No recurrences could be found in any of the 23 hernias after five to one hundred and eight months.

6. With recurrent, sliding and large inguinal hernias, for which recurrence rates as high as 50 per cent have been reported, division of the spermatic cord, with the testis left *in situ*, permits complete closure of the inguinal canal and therefore offers substantial aid in repair.

7. After division of the spermatic cord, preservation of the testis depends largely on the prevention of infection. Gentle handling of tissues is required; meticulous hemostasis must be secured and rigid asepsis maintained. Nonabsorbable suture materials are recommended.

RESUMEN

En el perro, la división del cordon espermático a varios niveles dentro del canal inguinal no produjo gangrena o necrosis del testículo, aunque produjo alguna degeneración de los canalículos y celdillas espermáticas. Paradojalmente, cuando el conducto deferente y su arteria fueron preservados, después de la división del resto de las estructuras del cordón, el testículo se atrofío completamente.

En el hombre, la división del cordón espermático dentro del canal inguinal pro-

duce ordinariamente moderada hinchazón del testículo en el período postoperatorio inmediato, pero después de unas cuantas semanas el órgano regresa ordinariamente a su tamaño preoperatorio. El estudio microscópico de dos de estos testículos mostraron tejido esencialmente normal.

En contraste con el perro, cuando el conducto deferente y su arteria fueron preservados después de la división del resto de las estructuras del cordón en dos sujetos, los testículos permanecieron propiamente normales. En uno de estos sujetos la eyaculación contenía espermatoides viables, aunque el conducto contralateral fué seccionado.

Veinte y tres hernias de los tipos directa e indirecta recidivantes, fueron reparadas en 20 pacientes con ayuda de la división del cordón espermático. Se perdío solamente un testículo por infección y otro fué extirpado debido al desarrollo de un hidrocele. Dos testículos se atrofiaron moderadamente, dos muy ligeramente y dos se hipertrofiaron ligeramente, permaneciendo normales los demás testiculos.

No se observaron recidivas en ninguna de las 23 hernias después de 5 a 108 meses.

En tratándose de hernias directas o indirectas recidivantes, en las que el índice de recidiva fué del 50%, la división del cordón espermático, dejando e testículo izquierdo *in situ*, permitió el cierre completo del canal inguinal, ofreciendo en consecuencia ayuda substancial para la reparación.

Después de la división del cordón espermático, la preservación del testículo depende ampliamente de la prevención de la infección. Se requiere el manejo delicado de los tejidos, debiendo asegurarse cuidadosa hemostasia y mantenerse rígida asepsia. Se recomienda el material de sutura no absorvible.

RÉSUMÉ

1. Chez le chien, la division de la corde spermatique et les différentes surfaces, au-dedans du canal inguinal, n'a pas amené de nécrose ou de gangrène des organes mâles, alors qu'une dégénérescence de la tubule et des cellules spermatiques se produit. Il est admis que lorsque le canal et les artères sont conservés indépendamment de la corde spermatique, il y a atrophie complète des testicules.

2. Chez l'homme, cette division a pour conséquence de diminuer l'écoulement après l'opération, mais quelques semaines plus tard, l'organe reprend sa structure normale. L'étude microscopique de ces deux testicules montre des tissus normaux.

3. Contrairement aux chiens, lorsque le canal et l'artère sont conservés, après division de la corde, chez 2 patients, les testicules sont demeurés normaux. Dans 1 de ces cas, l'écoulement contenait des spermatozoïdes, alors que le canal du côté opposé avait été divisé.

4. 23 hernies du recurrent chez 20 patients ont été réparées à l'aide de la séparation de la corde spermatique. A cause de l'infection, nous avons perdu 1 testicule et 1 a été enlevé à cause de l'hydrocèle qu'il présentait. 2 testicules ont été atrophiés passablement; 2 peu atrophiés et 2 hypertrophiés. Les autres se sont avérés normaux.

5. Il n'y a pas eu de récidive chez ces 23 cas après 5 mois et encore aujourd'hui, après 108 mois.

6. Lan les cas de hernies inguinales à récidive, 50% des cas ont été rapportés. La division de la corde spermatique, avec les testicules laissés "in situ," a permis la fermeture du canal inguinale et la régression compléte de la hernie.

7. Après division de la corde spermatique, la conservation des testicules dépend largement de la prévention de l'infection. La maniement délicat des tissus est requis; la prévention de l'hémorragie et une aseptie sévère.

Il est déconseillé de se servir de matériel de suture non absorbable.

RIASSUNTO

1. La sezione del funicolo del cane, a varia altezza nel canale inguinale, non produce gangrena o necrosi del testicolo

ma solo qualche fenomeno degenerativo nei tubuli e nelle cellule spermatiche. Si ottenne un effetto paradosso quando si sezionarono tutti gli elementi del funicolo meno il deferente e la sua arteria, poichè il testicolo si atrofizzò completamente.

2. Nell'uomo la sezione del funicolo nel canale inguinale produce di solito una tumefazione modesta del testicolo nell'immediato periodo post-operatorio; dopo poche settimane esso ritorna al suc volume primitio. Dal punto di vista istologico 2 di questi testicoli dimostrarono tessuti normali.

3. In contrasto con quanto succede nel cane il testicolo rimase macroscopicamente normale in 2 pazienti in cui vennero risparmiati il deferente e la sua arteria dopo sezione delle altre strutture del funicolo. In uno di essi l'eiaculato conteneva spermatozoi viventi, benchè il deferente del lato opposto fosse stato sezionato.

4. Sono state operate 23 ernie recidive, da scivolamento o indirette in 20 pazienti, con l'aiuto della sezione del funicolo.

Un testicolo fu perduto per infezione e un altro asportato per idrocele. Degli altri testicolo 2 divennero ipotrofici, 2 leggermente atrofici e 2 leggermente ipertrofici. Gli altri rimasero normali.

5. Non si è avuta alcuna recidiva sulle 23 ernie in un periodo da 5 a 108 mesi.

6. Nelle ernie recidive, da scivolamento e permagne, nelle quali sono state riferite percentuali di recidiva del 50%, la sezione del funicolo, con testicolo lasciato in situ, permette la chiusura completa del canale inguinale e quindi offre un aiuto sostanziale alla cura.

7. Dopo sezione del funicolo la conservazione del testicolo dipende largamente dalla profilassi dell'infezione. E' necessario maneggiare i tessuti con delicatezza, si deve provvedere a una meticolosa emostasi e si deve mantenere una rigorosa asepsi.

Si raccomanda di usare materiali non riassorbibili.

ZUSAMMENFASSUNG

1. Die Durchtrennung des Samenstranges an verschiedenen Stellen innerhalb des Leistenkanals hat beim Hunde weder zu Gangraen noch zu Nekrose des Hodens gefuehrt, wenn auch eine gewisse Degeneration der Samengaenge und der Samenzellen auftrat. Merkwuerdigerweise kam es zu einer voelligen Atrophie des Hodens, wenn nach Durchtrennung der uebrigen Gebilde des Samenstranges der Ductus deferens und seine Arterie erhalten wurden.

2. Beim Menschen fuehrte die Durchtrennung des Samenstrangs innerhalb des Leistenkanals gewoehnlich zu einer maessigen Schwellung des Hodens gleich nach der Operation; nach einigen Wochen aber erreichte das Organ gewoehnlich wieder seine praeoperative Groesse. Die mikroskopische Untersuchung zweier solcher Hoden ergab im wesentlichen normales Gewebe.

3. Bei zwei Kranken, bei denen der Ductus deferens und seine Arterie nach Durchschneidung der uebrigen Samenstranggebilde erhalten wurden, blieben die Hoden im Gegensatz zu den Erfahrungen am Hunde im Grossen und Ganzen normal. Bei einem dieser Kranken enthielt das Ejakulat lebende Spermatozoen, obgleich der Samenstrang der anderen Seite durchtrennt war.

4. An 20 Kranken wurden 23 Hernien—rueckfaellige, gleitende und grosse indirekte Brueche—mit Hilfe der Durchtrennung des Samenstranges repariert. Ein Hoden ging infolge von Infektion zugrunde und ein anderer wurde wegen Entwicklung einer Hydrozele entfernt. Zwei Hoden entwickelten eine maessige, zwei eine sehr geringe Atrophie und zwei wurden leicht hypertrophisch. Die uebrigen Hoden blieben normal. Bei keiner der 23 Hernien kam es nach 5 bis 108 Monaten zu einem Rueckfall.

5. Die Durchtrennung des Samenstranges unter Belassung des Hodens in situ ermoeglicht bei rueckfaelligen, gleitenden und grossen Leistenbruechen, die Rueckfallsziffern bis zu 50% aufweisen,

eine voellige Schliessung des Leistenkanals und ist daher von wesentlichem Wert in der Reparierung.

6. Die Erhaltung des Hodens nach Durchtrennung des Samenstranges haengt zum grossen Teil von der Verhuetung einer Infektion ab. Zarte Behandlung des Gewebes ist erforderlich, auf sorgfaeltige Blutstillung und Innehaltung strengster Asepsis muss geachtet werden. Die Verwendung nicht resorbierbaren Nahtmaterials wird empfohlen.

SUMARIO

1. No cão, o corte do cordão espermatico a varios niveis dentro do canal inguinal não produz gangrena ou necrose dos testiculos, muito embora se produza alguma degenedação dos tubulos e das celulas espermaticas. Paradoxalmente, quando o ducto deferente e sua arteria são preservados depois da divisão do resto das estruturas do cordao, os testiculos se abrofiam completamente.

2. No homem, o corte do cordão espermatico dentro do canal inguinal produz usualmente moderado edema dos testiculos no periodo posoperatorio imediato, mas, depois de poucas semanas o orgão usualmente retorna ao ser tamanho preoperatorio. O estudo microscopico de dois desses testiculos mostrou tecido essencialmente normal.

3. Em contraste com o cão, quando o deferente e sua artéria são preservados depois da divisão do resto das estruturas do cordão em 2 pacientes, os testiculos permaneceram grosseiramente normais. Em um desses pacientes o liquido ejaculado continha espermatozoide viavel, ainda que o ducto do lado oposto tivesse sido cortado.

4. Vinte e tres hernias do tipo recurrente, e 20 por deslizamento e largas, indiretas hernias foram reconstruidas com o uso das divisão do cordão espermatico. Um testiculo foi perdido devido a infeção e um foi removido devido ao desenvolvimento de hidrocele. Dois testiculos se mostraram moderadamente atroficos, 2 muito ligeiramente atrofiados e 2 ligeiramente hipertroficos.

Os outros testiculos permaneceram normais.

5. Nenhuma recurrencia poude ser entontrada em qualquer das 23 hernias depois de 5 a 158 mezes.

6. Em relação as grandes hernias por escorregamento inguinais e recurrentes, nas quais a taxa de recurrencia tem sido relatada até tanto como 59 por cento, a divisão do cordão espermatico, com os testiculos deixados *in situ* permite o completo fechamento do cordão inguinal e portanto oferece ajuda substancial a herniorrafia.

7. Depois da divisão do cordao espermatico, a preservação testiculos depende grandemente de se prevenir a infecçao. Manuseio delicado dos tecidos é requirido, meticulosa hemostasia deve ser assegurada e rigida assepsia mantida. Materiais de sutura não absorviveis são recomendaveis.

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Repair of Abdominal Hernia with Steel Cloth Implant

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THE high rate of recurrence of abdominal hernia suggests that the standard methods of repair are not satisfactory in all cases. Various surgeons have reported 10 to 50 per cent recurrence rates after the usual methods of repair of inguinal hernia. Among persons over 50 years of age the recurrence rate for direct inguinal hernia is 38 per cent; for indirect inguinal hernia, 30 per cent.[1]

The chief causes of recurrence of hernia are (1) closure of the abdominal defect under tension; (2) postoperative wound infection or hematoma; (3) postoperative cough; (4) attenuated or weak musculofascial tissues; (5) obesity, and (6) middle age.

Of these factors, wound tension is probably the most important. It is the one factor that the surgeon can control by the use of an implanted nonirritating fabric to occlude the tissue defect. Prompt and uncomplicated wound healing cannot occur when wound tension interferes with adequate local blood supply. Tension is the enemy of good wound healing because it favors local necrosis and infection.

In recent years the availability of tantalum, glass and stainless steel in the form of thin pliable fabrics has offered nonirritating materials that can be successfully employed as a "blow-out" patch in the repair of hernias without tension. Metalic implant repair of hernia was reported in 1907[2] and 1928,[3] but because of stiffness, lack of strength, and fragmentation of silver netting in the tissues, results were not satisfactory. Surgical teaching since the time of Halsted has developed a surgical conscience that rebels at the use of large amounts of foreign material in surgical wounds. If the surgical use of steel cloth and glass cloth implants offends this conscience, one may conclude that results justify the use of inert, nonirritating inorganic implants.

Large defects of the abdominal wall are seldom successfully repaired by the standard methods now in use. Fascial flaps and relaxing incisions often prove delusive in reconstruction of the abdominal wall.[4] By their use the area of weakness is enlarged, local blood supply to the supporting structures is impaired, and recurrence of the hernia is common. Fascia and cutis grafts lack sufficient strength.[5] They are not living grafts; wound infection is a common postoperative complication, and the hernia frequently recurrs.

Tests in the surgical laboratory show that organic substances are irritating to animal tissues, are poorly tolerated and tend to be extruded. Inorganic materials, such as glass and stainless steel, produce minimal tissue reactions and are relatively well tolerated.[6] Ideal materials for implanting in healing wounds should conform with the following criteria:

1. Biologically nonirritating in tissues; of inorganic composition.
2. Easily sterilized and not altered by sterilization.
3. Chemically inert in tissue fluids.
4. Pliable, nonrigid, to adjust with local movement in tissues.
5. Strong, to withstand local stress and intra-abdominal pressure.
6. Nonelectrolytic.
7. Workable, not subject to fragmentation in the tissues.

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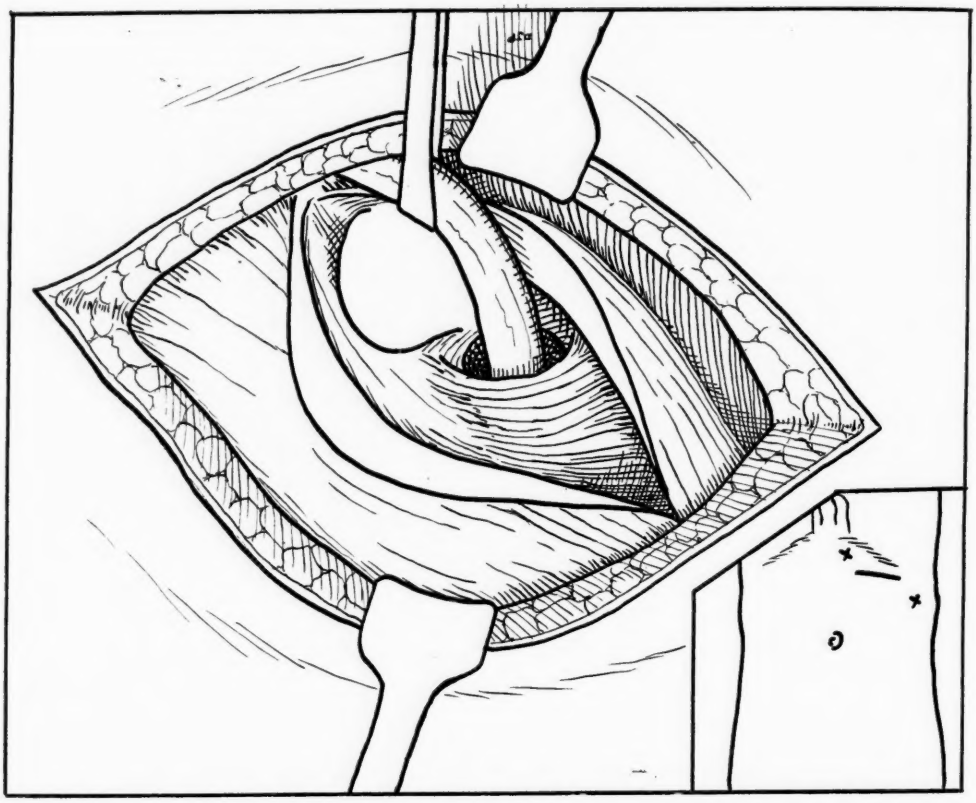

Fig. 1.—Roof of inguinal canal opened and aponeurosis of external oblique split upward well above the abdominal ring, exposing the internal oblique muscle. A direct hernia sac is shown separated from the retracted spermatic cord. Insert indicates incision in the line of skin cleavage centering over the right abdominal inguinal ring.

8. Readily available and inexpensive.[7]
9. Nonhydroscopic.
10. Nonopaque to roentgen rays.

Thin, fine-mesh annealed stainless steel cloth most nearly fulfills these requirements. Glass cloth is also a suitable implant material, though less desirable than steel cloth.

Generous supplies of various "fiberglas" fabrics were donated for clinical use by the Owens-Corning Fiberglas Corporation of Toledo, Ohio. In the fabrication of glass cloth a thin sizing of mineral oil and starch is required to make the delicate coiling fibers workable in the weaving process. The sizing material is an organic tissue irritant, but removal of the sizing changes the quality of the fabric, makes it more brittle, and produces a tendency to fragmentation. The cut edges of glass cloth fray easily in handling, and this inconvenience is only partly reduced by cutting the cloth with pinking shears. Wounds containing glass cloth implants show a slight inflammatory blush, swelling, and tenderness, which subsides in about three days after the operation. During the healing process fibroplastic tissue growing into, over, and through the interstices of the cloth forms a solid patch to occlude the defect in the abdominal wall.

Stainless steel cloth and tantalum mesh do not require irritating sizing materials

and therefore cause less tissue reaction. Absence of visible wound reaction is usual after implantation of steel cloth. No clinical or microscopic difference was observed in the minimal tissue response to stainless steel and tantalum.[8] Thin fibroplastic tissue grows through the interstices and covers the metal cloth implant during the healing process. Stainless steel cloth has greater strength than tantalum mesh per unit size and is obtainable in a wider variety of fabrications.[9] More delicate and pliable weaves in fine mesh are available in steel cloth. Tantalum mesh has a tendency toward fragmentation in the tissues after wound healing, though this does not appear to jeopardize the success of the repair.[10] Physical advantages make stainless steel cloth a more satisfactory material for use as an implant.

The undesirable and unnecessary closure of the musculofascial defect with sutures under tension in the standard manner can be avoided, and with a better chance of cure, by the use of a "blowout patch" of steel cloth. Intra-abdominal tension is distributed over the surface of the implant and not against a line of sutured tissue under tension. The implant eliminates or greatly reduces wound tension and favors maximum local blood supply, which is essential to prompt and secure wound healing. The steel cloth prosthesis is cut (at the operating table) so that it will extend 1 cm. or more be-

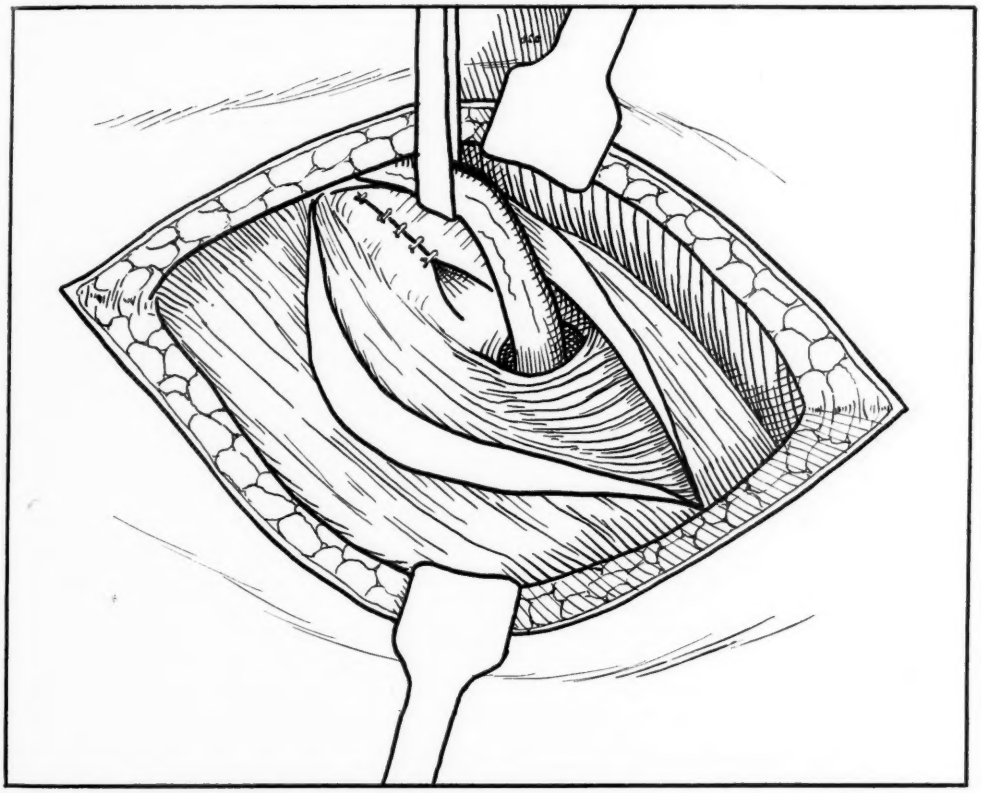

Fig. 2.—The direct hernia sac reduced into the abdomen, where it is retained by closure of the transversalis fascia with stainless steel sutures. The sac is not removed.

yond the edge of the aperture to be occluded. Stainless steel cloth, 145 mesh of 0.0015 inch wire (the W. S. Tyler Co., Cleveland 14, Ohio), and 50 mesh of 0.003 inch wire ("Surgaloy" (R), Mesh, Davis and Geck, Inc., Brooklyn), are suitable for a wide variety of hernia repairs. Mechanical advantage is gained by suturing the implant to the under surface and about 1 to 2 cm. from the edge of the defect with nonirritating fine annealed stainless steel sutures. Silk, cotton, catgut, or other irritating organic sutures are to be avoided in fixing the implant and closing the wound, as they may lead to serum collections, undue tissue reactions, or infection and sinus formation.

Inguinal Hernia.—The chief steps in the "blow-out patch" repair of inguinal hernia are shown by diagrams in Figs. 1, 2, 3, and 4. Steel cloth implant is indicated for the repair of any inguinal hernia when the defect cannot be closed in the usual manner without tension or when the local musculofacial tissues are weak, attenuated, or inadequate. I have not found the use of an implant necessary in repairing the hernias of infants or children. The implant is especially useful in

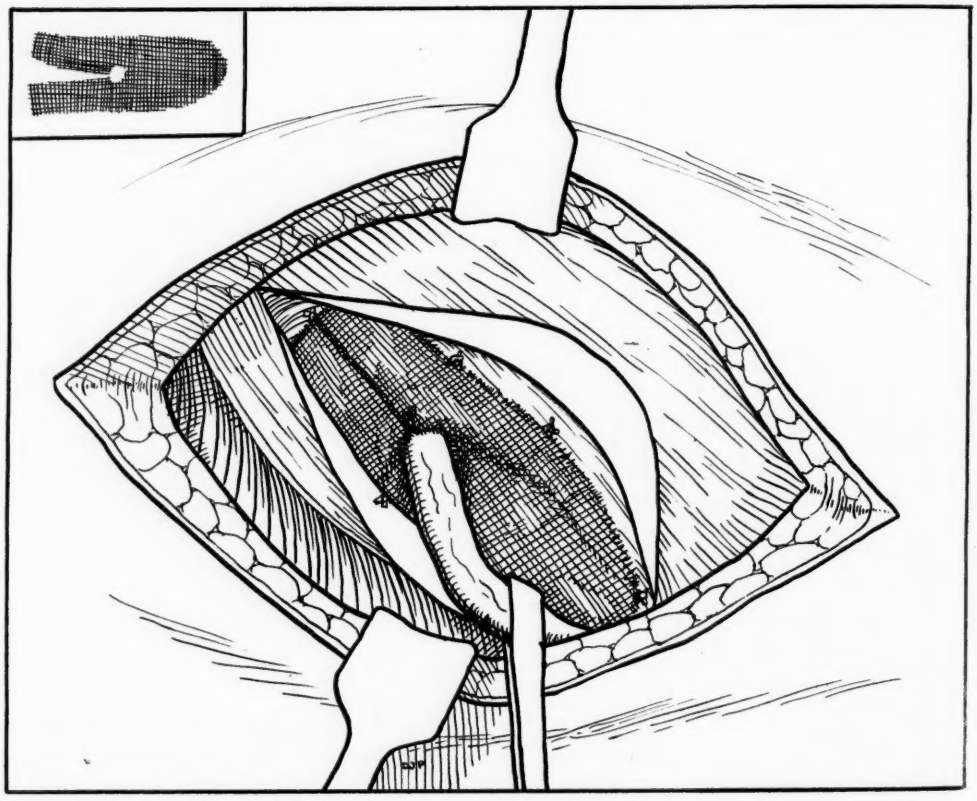

Fig. 3.—Thin, flexible, stainless steel cloth implant anchored by No. 32 stainless steel sutures to Cooper's ligament and the retropubic fascia below, to the shelving edge of the inguinal ligament laterally, to the edge of the rectus sheath medially, and to the internal oblique muscle above. Insert shows section of steel cloth cut with scissors to approximate size 12 x 5 cm. and slotted to accommodate the cord through its central portion. The weak area at the abdominal inguinal ring and the site of the hernia at Hesselbach's triangle are reinforced by the steel cloth "blow-out patch."

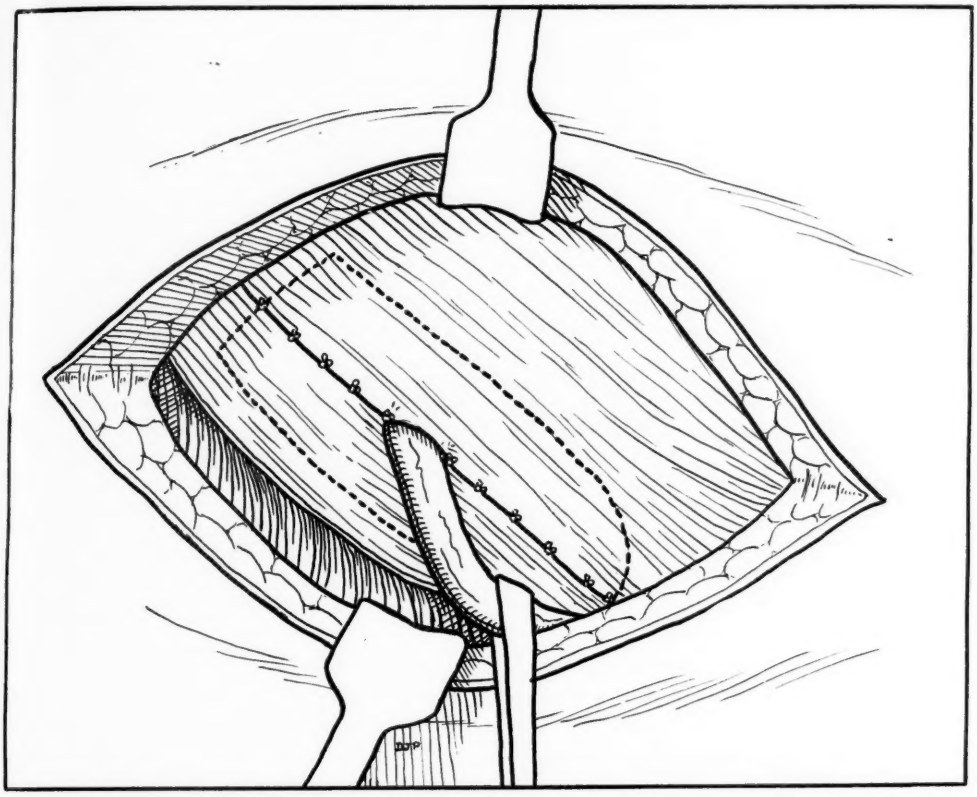

Fig. 4.—Dotted line indicates the position of the steel cloth implant beneath the leaflets of the external oblique aponeurosis, which are closed over it with interrupted sutures of No. 32 stainless steel. The superficial fascia and skin are next closed over the cord in layers with interrupted No. 35 stainless steel. Secure repair of the defect by a steel cloth "blow-out patch" is obtained without wound tension.

the repair of direct hernia, recurrent hernia, hernia in the obese, and hernia in persons over 35 years of age. Removal of the sac is seldom necessary or desirable in the implant repair of direct hernia. A large weak area at the abdominal inguinal ring is repaired with an implant as for direct hernia after high ligation and excision of the indirect hernia sac. Uncomplicated small indirect hernias in young adults do not require these special measures, though the risk of recurrence is eliminated or reduced by the use of an implant. In uncomplicated cases the technic of implant repair is neither difficult nor unduly time-consuming; it requires no more operating time than do the orthodox methods.

Incisional Hernia.—Certain large incisional hernias, once considered incurable, can now be successfully repaired with a steel cloth implant. A large hernia containing much of the abdominal visceral tissue which has "lost the right of abdominal domicile" may be partially reduced and the remainder of the viscera retained by a convex-shaped steel cloth made fast by sutures of stainless steel to the circumference of the abdominal defect.

In smaller incisional hernias, even though the musculofascial edges can be coapted by sutures, it is preferable to em-

ploy the "blow-out patch" of steel cloth, which is then covered only by fat and skin sutured in layers with fine steel. This avoids wound tension, which too often results in recurrence of the hernia.

It is unnecessary to obtain closure of the peritoneum over which to place the implant. The smooth steel fabric can be placed directly over the intestines and has not caused symptoms or intestinal complications from being in contact with the bowel. Reoperation in such cases has shown several areas of fibrous adhesion between the intestine and the implant, but much of the implant surface remained free and clear. The steel cloth should be sutured with stainless steel sutures to the peritoneal surface, about 1 to 2 cm. from the edge of the defect.

After the implant repair of a large incisional hernia, serum tends to collect in the potential space between the fat and the implant. Two methods are satisfactory for the relief of this condition. A slender perforated stainless steel tube drain is placed beneath fat and skin and is removed in twenty-four to seventy-two hours when drainage of serum has ceased. Primary closure of the wound can be done, and repeated aspiration of serum by syringe and needle is then used as indicated by reexaminations of the wound. Tight pressure dressings cause the patient discomfort, do not prevent serum collections, and are considered neither necessary or advisible.

Diaphragmatic Hernia.—Large defects in the diaphragm do not lend themselves readily to suture of the widely separated musculofascial edges. The sac is usually thin tissue of poor quality and unsuited for secure repair of the defect. A steel cloth implant employed to occlude the diaphragmatic aperture is best sutured to the abdominal side of the diaphragm, the edges of the implant extending about 2 cm. beyond the edges of the defect. When the implant is placed over the thoracic surface of the defect as an onlay patch, it lacks mechanical advantage in retaining abdominal pressure from below it. I have found the abdominal approach more desirable when the hernia involves the esophageal hiatus. The thoracic approach leaves little space to work between the heart and a posterior diaphragmatic defect near the midline. The implant can be cut to fit around the esophagus.

Pelvic Hernia.—A transvaginal enterocele that protrudes beyond the introitus may follow vaginal hysterectomy or be associated with procidentia uteri. The levator muscles are attenuated and usually inadequate for satisfactory repair of the hernia. A reliable artificial pelvic floor can be fashioned from steel cloth. By transvaginal approach the implant is fixed laterally to the ischial tuberosities, posteriorly to the presacral fascia and anteriorly to the subvesical or retropubic fascia with steel sutures. A semicircular cut in the implant permits it to fit around the rectum. Pelvic perineal hernia associated with rectal procidentia is repaired in a similar manner through an incision extending transversely across the perineum between the ischial tuberosities. The artificial pelvic floor replaces the nonfunctioning levator muscles and supports the abdominal viscera and the rectum.

Epigastric, Lumbar, Umbilical, and Femoral Hernias.—Large hernias of these types with widely separated or inadequate musculofascial tissues are best repaired with a steel cloth implant to reduce the incidence of recurrence. The technic is similar to that described for the repair of incisional hernia.

Postoperative Treatment.—Early ambulation is encouraged to prevent pulmonary complications and thrombophlebitis. Male patients stand at the bedside to void if they desire. Catheterization is used as indicated for the relief of retention. Postoperative pain is often less severe and of shorter duration after steel cloth implant repair than is the pain that follows suturing with wound tension by standard methods. Moderate doses of morphine for relief of incisional pain are seldom required after thirty-six hours. To prevent atelectasis, cough is not suppressed by sedatives or narcotics. The patient is encouraged to expectorate tracheal

mucus, and mild expectorant mixtures are given in appropriate cases. Antibiotics are given at eight-hour intervals for about eight doses to prevent possible wound inflammation.

REPORT OF CASES

In the past five years 284 implants of glass cloth and steel cloth have been employed in the repair of abdominal hernia. Steel cloth implants have been used in 108 instances in 89 patients. Glass cloth implants have been used in 176 instances in 146 patients. There were no operative deaths. The youngest patient was 1½ years old and the oldest was 86.

Indirect hernia was associated with direct hernia on the same side in 52 cases. There were 91 direct inguinal hernias, 25 indirect, "sliding", and scrotal hernias, 37 recurrent inguinal hernias, 34 incisional hernias, 11 recurrent incisional hernias, 15 ventral and umbilical hernias, 3 recurrent umbilical hernias, 4 epigastric hernias, 2 perineal hernias and 1 diaphragmatic hernia.

In 20 instances the hernia repair was done in conjunction with other procedures: 9 cholecystectomies, 2 gastrectomies, 2 abdominal lipectomies, 2 excisions en block of the abdominal wall for metastasizing carcinoma, 1 resection of the descending colon, 1 total hysterectomy, 1 repair of anal sphincters, 1 removal of common duct stones, and 1 closure of a perforated peptic ulcer.

Postoperative wound infection in "clean" cases required removal of 5 glass cloth implants and 2 steel cloth implants. None of the hernias in this group have recurred.

No hernias have recurred through the region of the implant. In some of the early cases of this series the implant used for inguinal hernia repair was not extended around and above the emergence of the spermatic cord but was confined to the region of Hesselbach's triangle, below the abdominal inguinal ring. In 5 of these cases (1.7 per cent) a "false" recurrence of the hernia developed above the site of the implant. No recurrence has yet been encountered in a patient who had the spermatic cord emerging through the implant as shown in Figure 3. Recurrence of inguinal hernia takes place during the first two years after the operation in 90 per cent of recurrences.[1] Sufficient time has not elapsed to determine the recurrence rate for persons in the more recent cases of this series, but a low recurrence rate can be anticipated from experience with the earlier cases.

SUMMARY

Secure closure of abdominal hernias can be made without wound tension by the use of a nonirritating implant of strong, thin, flexible stainless steel cloth. The technic of steel cloth "blow-out patch" repair is not difficult. It is indicated for the closure of large abdominal defects with widely separated musculofascial edges, for recurrent and incisional hernias, and for patients who have weak, attenuated or inadequate musculofascial structures.

The present rate of recurrence following standard methods of hernia repair is too high. The chief cause of recurrence is the suturing of musculofascial defects under tension. Experience with 284 implant repairs of defects of the abdominal wall, including diaphragmatic and pelvic hernias, during the past five years is reported. Steel cloth implant repair of hernia offers a method of secure closure without wound tension and a better opportunity for permanent cure.

RÉSUMÉ

La réduction des hernies abdominales peut être faite d'une façon permanente et sûre aves des linges d'acier. Cette méthode n'est pas compliquée. Elle est employée dans les cas de défectuosité abdominale présentant des bords largement séparés, dans les hernies incisionnelles et recurrentes ainsi que chez les patients ayant une musculature de faible consistance.

Le besoin immédiat de reduire une hernie est grand. La principale cause en est la suture de cette défectuosité abdominale sous tension. L'expérience pratique montre 284 cas de hernies chez des musculatures faibles, comprenant les hernies diaphragmatiques et pelviennes, sur une période de 5 ans. L'emploi du linge d'acier offre une meilleure réduction, un procédé plus sûr et une guérison permanente.

RESUMEN

Puede hacerse el cierre seguro y sin tensión de las hernias abdominales con la implantación de una tela de acero inoxidable fuerte y delgada. La técnica para "parchar" con tela de acero no es difícil. Está indicada para el cierre de amplios defectos abdominales con bordes músculoaponeuróticos muy separados, para hernias postoperatorias recidivantes y en pacientes en quienes con estructuras músculoaponeuróticas débiles, atenuadas o inadecuadas.

El índice actual de recidivas postoperatorias con los métodos ordinarios es demasiado alto, siendo la causa principal de la recidiva los defectos de la sutura músculoaponeurótica bajo tensión. Se da a conocer el resultado de 284 reparaciones de defectos de la pared abdominal por implantación, incluyendo hernias diafragmáticas y pelvianas en los últimos cinco años. El método ofrece un cierre seguro sin tensión de la herida y con mejor oportunidad para la cura permanente.

RIASSUNTO

Si può ottenere una solida chiusura delle ernie addominali, senza tensione dei tessuti, usando un foglio di acciaio inossidabile, non irritante, robusto, sottile, flessibile. La tecnica di impianto del foglio di acciaio non è difficile. E' indicato nella chiusura di vaste perdite di sostanze addominali, con orli muscolo-fasciali ampiamente separati, di ernie recidive e postoperatorie e in quei malati che hanno tessuti muscolari e fasciali deboli, sottili o insufficienti.

La cifra attuale di recidive dopo i communi metodi di plastica per ernia è troppo alta. La causa principale di recidiva è la sutura sotto tensione. Vengono riferiti i dati di una esperienza personale ottenuta in 284 plastiche di parete addominale, comprese ernie diaframmatiche e pelviche, in 5 anni. Il metodo di plastica con foglio di acciaio offre la possibilità di chiudere le ferite senza tensione e consente di ottenere guarigioni permanenti.

ZUSAMMENFASSUNG

Eine sichere Schliessung von Bauchbruechen kann unter Vermeidung von Spannungen der Wunde mittels Einpflanzung eines reizlosen, festen, duennen, biegsamen Gewebes aus rostfreiem Stahl ausgefuehrt werden. Die Technik der Reparatur mittels eines solchen "Pflasters" aus Stahlgewebe ist nicht schwierig. Das Verfahren eignet sich zur Schliessung grosser Bauchwanddefekte mit weit getrennten Muskelfaszienraendern, rueckfaelliger und postoperativer Hernien und fuer Kranke mit schlaffem, geschwaechtem oder unzulaenglichem Muskelfasziengewebe.

Rueckfaelle nach Hernienreparaturen mit den ueblichen Methoden sind zur Zeit allzu haeufig. Die wesentliche Ursache liegt darin, dass der Muskelfasziendefekt unter Spannung vernaeht wird. Es wird ueber in den letzten fuenf Jahren gewonnene Erfahrungen an 284 Einpflanzungsreparaturen von Bauchwanddefekten einschliesslich Zwerchfell-und Beckenhernien berichtet. Die Reparatur von Hernien mit Einpflanzung von Stahlgewebe stellt eine sichere Methode des Verschlusses ohne Wundspannung dar und verbessert die Aussichten auf endgueltige Heilung.

SUMARIO

O fechamento seguro de hernias abdominais pode ser feito sem tensão com o uso de implantação de tecido de aço forte, fino, flexivel e inoxidavel. A tecnica de tecido de aço para "remendo de rotura" não é dificil. E indicada para o fechamento de defeitos abdominais grandes com margens musculo - aponeuroticas largamente separadas para hernias recurrentes e incisionais e para pacientes que possuam estruturas musculo-aponeuroticas inadequadas, fracas ou adelgaçadas.

A acual taxa de reseurrencia seguindose a processos classicos de reparo de hernia é muito alta. A principal causa de recurrencia é a sutra de defeitos musculoaponeuroticos sob tensão. E relatada a experienca com 284 reconstruções de de-

feitos de parêde abdominal, incluindo hernias diafragmaticas e pelvicas, durante os passados cinco anos. O enxerto de tecido de aço oferece um metodo de fechamento seguro de hernias, sem tensão da ferida e uma grande oportunidade para a cura permanente.

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The patient who consults his physician is usually apprehensive. In spite of his calm exterior, a hundred fears chase one another through his mind and any unusual manoeuvre by the physician may bring out a crop of goose flesh which he has not known since, as a boy, he went to bed in the dark. He wonders why the doctor listens to his heart with a stethoscope, why he takes his blood-pressure, why he tests his urine for sugar, why he looks at his blood under the microscope. What is the value of a Wassermann test, what does a metabolism test mean, why do doctors talk about calories and vitamines?

These queries, and others that flash through his mind, this book endeavours to answer. It is an attempt to explain why the physician uses certain tests, how he got them, and what bearing they have upon his diagnosis and treatment. This book also attempts to show that the methods of treatment and diagnosis employed by the modern physician are the logical results of discoveries in the more exact sciences of anatomy, physiology, biology, physics, and chemistry. Modern medicine belongs to no school except the school of experience. It has no dogmas to defend, no catechisms to teach. While it reveres its masters, their opinions have no force of authority except that which the experience of the laboratory and the sick-room confers upon them.

Certain diseases much in the public mind today are also discussed. Many other striking medical discoveries could of course be added. But a wise physician does not overdose his patients, even with facts.

—Ralph H. Major

Results of Treatment of Urethral Rupture

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THE treatment of urethral injuries was formerly based on principles presented in the classic textbooks of Young, Legueu, Marion, Wildbolz, Chevassu, Böminghaus, Michon, Covelaire, etc. In recent years the use of antibiotics has resulted in a change of methods and the achievement of improved results. It is the purpose of this paper to describe the results of modern treatment in 100 cases of urethral rupture observed in a clinic from January 1945 to November 1951.*

I have reported, with my Surgeon-in-Chief, Prof. Kojen, as co-author, our experiences in treating urethral and urethrorectal injuries. In another publication we described our methods of treatment of 150 patients with open and closed urethral injuries, stressing the care of wounds of the urethra and certain unique methods of treatment.

From January 1945 to January 1952 the Urological Clinic admitted 170 patients with urethral injuries. Of these injuries, 65 were open wounds and 105 were ruptures. In 1945, during the war, and in the period immediately after it, there were 55 wounds of the urethra and only 15 ruptures. On the other hand, we treated only 10 wounds and 90 ruptures of the urethra in the period from 1946 to 1952.

Site of Rupture.—The anatomic distribution was as follows: penile portion of urethra, 5; bulbar portion (including the scrotal portion), 53; membranous portion, 33, and prostatic portion, 9.

The location of the urethral rupture depends on the mechanism of injury. Rupture of the penile portion of the urethra usually occurred after direct trauma, and rupture of the bulboscrotal part was most often caused by compression during a fall with the legs forked. In contrast, injuries to the membranoprostatic part resulted almost exclusively from bone injuries produced by fracture of the pubic bones or luxation of the symphysis. Sometimes injuries by bone fragments extended distally, so that traumatic changes were evident also at the beginning of the bulbous portion of the urethra. However, all these observations were made on injuries seen for the first time some weeks after they had occurred, and it is possible that these peribulbar changes may have been secondary to hemorrhage. We almost always formed an idea as to the location of the rupture by the nature of the injury. These factors also influenced to some extent our choice of the method of treatment.

Mechanism of Rupture.—Urethral rupture in this series of cases occurred as follows: traction of the penis during erection, 1; direct trauma to the penis, 2; perineal trauma, 8; injury by intraurethral manipulations, 3; falls on the perineum (in forked posture), 39; traffic accidents, 26, and crushing of the pelvic girdle, 20. In 1 case the data available were insufficient to indicate the mechanism.

Lesions of the Pelvic Bones.—Ruptures in the membranoprostatic part of the urethra are usually associated with injuries to the pelvic bones. The bulbous part is rarely involved in these fractures. Of 42 cases of injury of the posterior part of the urethra, we could ascertain the existence of fractures of the pelvic bones in 32, luxation of the symphysis in 2, and what was probably a temporary luxation in 1. In 7 cases fracture could not be excluded. In 2 cases destruction of the

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*Because of restrictions in expedition, the paper is divided into two parts.—*Author.*

pelvic bones was so extensive that we had great difficulty in reconstructing the urethra, and in 1 case we had to perform a wedge resection of the bony callus at the symphysis in order to clear the way for the urethra.

Degree of Rupture and Periurethral Changes.—Injuries of the penile, scrotal and bulbar portions of the urethra were most frequently incomplete: i.e., there was separation of only a part of the circumference of the urethra. Of 53 cases of trauma to the bulbar-scrotal parts, we encountered incomplete severance in 43 and probably complete severance in 10. In most cases spontaneous urination or easy catheterization indicated that we were dealing with incomplete urethral rupture. Persistent retention and large hematomas most frequently complicated the complete ruptures.

Unless the urethra is immediately explored, it is difficult to ascertain with certitude whether or not a rupture is complete, but our material clearly indicates a much larger percentage of incomplete ruptures of the bulbar portion of the urethra. As regards the penile portion, the ruptures were incomplete in all 5 cases. Rupture of the posterior portion showed a slightly greater frequency of incomplete ruptures (22) over complete ones (20). This is contrary to the generally accepted belief that ruptures of the posterior portion of the urethra are almost invariably complete. This only appears to be so because catheterization is impossible, and the urethra is often permitted to heal during cystotomy drainage. Complete stenosis will often occur and lead to the erroneous conclusion that the separation was complete.

The degree of injury with incomplete rupture of the anterior portion of the urethra is difficult to judge with certainty; e.g., it is not always possible to make a clear distinction clinically between partial and total urethral rupture. Digital examination of the rectum according to Vermooten enables one to determine whether there is complete or incomplete rupture of the membranous portion. The apex of the prostate is impossible to palpate in the former condition, but the prostate is found at its proper place in the latter.

An estimate of the degree of rupture is important in the choice of treatment. In a case of complete rupture it is necessary to repair the urethra if good permanent results are desired; with incomplete rupture, one has a choice among other methods. Furthermore, while complete rupture seen immediately after the accident makes a cystostomy indispensable, incomplete rupture does not always necessitate this operation.

The presence of a periurethral hematoma is important. If it is large it can cause retention, which otherwise would not occur. Later, such a hematoma may suppurate. Even if it absorbs favorably, it tends to develop stenosis. Even without suppuration, the hematoma increases periurethral cicatrization and narrows the urethra. It may eventually require urethral resection even though the degree of rupture was minor.

Early evacuation of a hematoma, especially if it is large, is indicated for rupture of the posterior portion of the urethra, since it will favorably influence the degree of cicatrization and improve the eventual results of surgical treatment. Drainage of a hematoma in the posterior urethra area should be suprapubic; if done in this way, it is quite sufficient. Perineal drainage of such a hematoma is not desirable (Wilson).

Severe hemorrhage is exceptional; in only 2 cases was immediate operation required because of hemorrhage from the larger branch of the arteria pudendae, (pudendal artery) and in only 1 case because of massive bleeding from the iliac vein, which had been injured by a fragment of the pelvic bone.

Periurethral suppuration is undesirable, since it increases scarification and indicates a bad prognosis with regard to the remote functional results. Severe cicatrization around the urethra may make subsequent urethral dilatation very difficult.

Regulation of Urine Flow After Injury.—1. *Spontaneous Urination:* This occurred in 41 cases, both with injuries of the membranous and of the bulbar portions of the urethra, which shows how often we encountered incomplete rupture. Urination was not always quite normal, however, because some of the patients had tenesmus. Of this group, we were compelled to perform subsequent cystostomies in 7. An important conclusion can be drawn from this: If in a case of suspected rupture there is spontaneous urination after the injury, it is probable that a good result can be obtained without local surgical intervention.

2. *Bladder Puncture:* This method was used in 2 cases.

3. *Indwelling Catheters:* Indwelling catheters or intermittent evacuatory catheterization were used in 19 cases. We were quite conservative with this procedure, because of the danger of infecting the periurethral hematoma. However, the majority of the patients had been catheterized before their arrival at the clinic. Catheterization can be utilized in cases of partial rupture permitting easy passage of the catheter and not associated with a large hematoma. In some cases, catheterization within two or three days or an indwelling catheter will render cystostomy unnecessary. With antibiotics, catheterization of ruptures is now much safer. We consider it dangerous to force the catheter when it does not pass easily.

4. *Emergency Cystostomy:* This procedure was done in 38 cases, and this high incidence emphasizes its importance. In certain cases this procedure could have been avoided. Some surgeons outside our clinic, in order to prevent complications, operate immediately. In case of doubt, however, it is preferable to do the cystossomy, since often it will have to be done later, at the time of the urethral repair. Prompt cystostomy is advantageous in cases of rupture of the posterior portion of the urethra, because with a single operation one can evacuate the periurethral hematoma, eliminate the possibility of periurethral infiltration, determine the status of the bladder and prevent possible osteomyelitis of the pelvis.

We endeavored to avoid cystostomy for those patients who urinated easily from the beginning or who were catheterized without difficulty, but we did not hesitate to perform it if spontaneous urination could not be established quickly, or if catheterization or an indwelling catheter produced fever or periurethral suppuration. We do not recommend perineostomy, because it is difficult to maintain asepsis.

Indications for immediate cystostomy are as follows: 1. All injuries, regardless of the site, that result in complete urinary retention that does not abate after one to three days. 2. Suspected vesical rupture. 3. Considerable dislocation of the pubic bones. 4. Crushing injuries of the bulbar portion of the urethra, with a large hematoma.

Cystostomy can also be used advantageously for retrograde catheterization in the surgical repair of a ruptured urethra.

Emergency cystostomy can be safely postponed (a) for any rupture, regardless of location, if there is spontaneous urination; (b) for rupture of the posterior portion of the urethra with only slight dislocations of the pubic bones, and (c) for any rupture associated with a small periurethral hematoma.

5. *Cystostomy Combined with Urethral Repair.*—In cases of partial urethroraphy, cystostomy sidetracks the urinary stream during the first ten days and permits the changing of the catheter by means of a guide thread. It is not sufficient to rely on the indwelling catheter alone, because, if the catheter falls out or clogs, reintroduction may be impossible.

In cases of complete circular urethroraphy, cystostomy is safer than the use of an indwelling urethral catheter. The latter may cause suppuration of the urethral seams and produce a fistula. There are other views in this regard. Good results without cystostomy have been reported by Kuss[8] and Pelkonnen (cited by Bertrand). The urethra is irrigated with an antibiotic solution injected along the catheter. In 1 case we obtained a good

result with this technic.

Methods and Results of Treatment.—The methods of treatment were as follows: dilatation of the urethra, 31 cases; internal urethrotomy, 6 cases; external urethrotomy, 2 cases; tunnelization of the urethra, 4 cases; excision of the periurethral scar, 2 cases; constant drainage, 3 cases; complete circular urethrorraphy, 24 cases; partial urethrorraphy, 1 case; incomplete urethrorraphy, or reconstruction of the urethra on an indwelling catheter, 24 cases, and excision of valvular stricture, 1 case.

Two patients refused operation. There were no deaths.

1. *Dilatation Without Surgical Treatment:* In 31 cases, dilatation was the treatment used. The lesions were minor ruptures of the bulbar or membranous portions of the urethra, with spontaneous urination either immediately or soon after a series of catheterizations. On the other hand, if we noted a marked tendency toward stenosis, we operated.

The urethra is frequently dilated after the injury, and at greater intervals later on. We had patients who after 2 to 3 stretchings urinated normally, maintaining this function for several years withfurther dilatations. One of our earlier patients was not treated for eighteen years, and when we examined him again, it was noted that a Charrière 14-18 could pass through. Such examples can also be found in cases of ruptures of the bulbar and membranous portions of the urethra.

Dilatations should be started early, as the urethra constricts rapidly even with a cystostomy. After ten days an attempt should be made to introduce a catheter or a bougie, if this has not already been done during the cystostomy. Sometimes, the surgeon will succeed in introducing the bougie though it was impossible to pass any instrument immediately after the injury. On the other hand, if after cystostomy the urethra is neglected, it may become completely occluded, even though immediately after the injury a catheter could have been passed.

If dilatation is infrequent, the urethral canal, in some cases, narrows quickly during the first month after injury. It is striking that, in some cases of injury of the bulbar part of the urethra, dilatation only for the first months did not prevent the appearance of a filiform narrowing many months or even years later. In contrast, in cases of rupture of the membranous part, if an adequate urethra could be maintained for some months, the caliber of the canal could then be indefinitely sustained by only rare dilatations. This confirms the opinion of some older authorities (Marion) that bulbar ruptures are prone to stenosis because of the presence of the surrounding corpus spongiosum.

2. *Internal Urethrotomy:* This procedure does not remove the periurethral scar, which is usually the main cause of stenosis, and is not, therefore, a suitable method for the treatment of urethral ruptures. Internal urethrotomy is indicated only for untreated ruptures when narrowing of the urethra has slowly developed. We applied it in 6 cases; in 3 of them because it appeared to us that it would solve the problem of stenosis after the injury, and in the other 3 because it appeared to us that it would solve the problem of stenosis after the injury, and in the other 3 because the patients refused urethrorraphy. In the 3 cases of elective internal urethrotomy, the results were good.

3. *External Urethrotomy:* External urethrotomy is seldom indicated, because, if the entire scar is not excised, the results of the operation are unsatisfactory. We performed external urethrotomy in 3 cases; in 2, the serious condition of the patients did not permit a more extensive operation, and in the third case it was done several years after an incomplete urethrorraphy because stenosis had developed. The results of this operation were mediocre.

4. *Tunnelization of the Urethra Through the Scar:* Forced perforation of the urethra is a poor procedure, because the periurethral scar, which causes the main difficulty, is not removed. It is not possible to obtain a good urethral passage

by making a canal through scarred tissue. We did this operation in only 4 cases. It is indicated only for short stenotic areas in the form of a curtain-like diaphragm in the posterior part of the urethra. In 3 cases the results were good, and in the fourth mediocre.

5. *Excision of the Periurethral Scar Without Urethral Operation:* In some cases it is possible to open the urethral canal by excising, through the perineal approach, the periurethral scarred tissue that has literally strangulated the urethra. These are cases of slight urethral ruptures in which the periurethral hematoma produces a large external scar. Foret did this operation in 4 cases; we did it only twice, with very good late results.

6. *Cystostomy, Retrograde Catheterization and Use of Permanent Catheter:* In 3 cases we obtained good results by performing immediate cystostomy and evacuating the periurethral hematoma from the retropublic region. After evacuating the hematoma we succeeded in catheterizing the urethra, which until then had been impassable. Leaving the indwelling catheter behind (with a conductive thread), we obtained good healing of the urethral lesion. This method appears to us commendable. It shows that ruptures of the posterior urethra are not as frequently complete as we usually think.

7. *Complete Circular Urethrorraphy:* —This is the best operation possible. In urethral ruptures, the damage to the urethra is never so extensive as to make it impossible to join the two ends of the urethra. The technic used is the one described by McGowen and Marion. It is essential to excise all scarred or contused tissue and to make a precise anastomosis of the two ends of the urethra. Th urinary stream should be diverted by cystostomy, and this we have done almost without exception. Good and rapid healing of the sutures is prerequisite to the avoidance of postoperative stenosis. We performed complete urethrorraphy in 24 cases with satisfactory and permanent results.

8. *Partial Urethrorraphy:* In certain cases it is feasible to excise only a part of the urethral circumference, leaving the intact part untouched. The intact portion serves to hold the two ends of the urethra together. This method has no particular advantage over complete urethrorraphy. We applied it in 1 case, with very good results.

9. *Incomplete Urethrorraphy:* This method closely resembles complete urethrorraphy. It is sometimes impossible to achieve adequate approximation of the two ends of the urethra, and the surgeon uses an indwelling catheter in the urethra as a splint, immobilizing as far as possible the two ends of the urethra around it. Slight defects in the urethra are then compensated for by organization of the tissue surrounding the catheter. Healing is not as good as after complete urethrorraphy, and the clinical results also are inferior. Nevertheless, urination can be maintained by systematic dilatations of the urethra. The indwelling catheter used in such cases does not give rise to fistulas, because the sutures are placed at some distance from the skin. We did this operation in 24 cases. The results were good, but inferior to those of complete urethrorraphy. We had to carry out frequent systematic dilatations in order to maintain the caliber of the urethral canal. This was seldom necessary after complete urethrorraphy.

In 2 cases, destruction and dislocation of fragments of the pubic bones were so extensive that the normal route of the urethra was literally barred. In 1 case, the first plastic reconstruction was unsatisfactory, and we were compelled to reoperate. The urethra was replaced in its normal position by resecting the osseous callus and opening an angle under the symphysis. The result was very good. In the other case we tried a permanent indwelling catheter; the patient is still under observation.

10. *Excision of a Valvular Stricture of the Urethra:* In 1 case there was a urethral stricture in the form of a corrugation barring the canal in the bulbar region. Treatment in this case was by excision of this corrugation.

Immediate or Delayed Repair of the Urethra.—The question arises whether to repair the urethra immediately after the injury or to postpone the repair. If there is spontaneous micturition, intervention may be delayed, but in other cases one may find indications both for and against immediate repair.

In the following instances, repair of the urethra should be delayed: 1. When there are multiple injuries and serious fractures of the pelvis associated with sever shock. 2. When there are technical difficulties in dealing with a rupture of the posterior portion of the urethra. In such cases, apart from the cystostomy, the surgeon should try to introduce an indwelling catheter to splint the urethra. 3. When the surgeon must work in badly contused tissue. The surgeon can proceed with an immediate repair in cases of rupture of the anterior portion of the urethra, with which shock is not associated and where work usually is technically easier than in the membranous portion.

Mortality.—Among our 100 patients with urethral rupture, there were no deaths, traumatic or operative.

SUMMARY AND CONCLUSIONS

One hundred and seventy urethral injuries were treated at the Belgrade Urologic Clinic between January 1945 and January 1952. Of this number, 105 were ruptures and 65 were wounds of the urethra. This paper describes the treatment, methods, and results in 100 cases of urethral rupture. A survey is given of the localization and mechanism of the ruptures. The significance of periurethral pathologic change, the types and degrees of urethral injury, and the subsequent development are discussed. The influence of these factors on the surgeon's decision with regard to methods of treatment is emphasized. The statistics, although they show a large percentage of cases in which spontaneous urination occurred, also indicate the importance of cystostomy in cases of retention. There were no deaths in this series of 100 cases.

RESUMEN

Ciento setenta lesiones uretrales fueron tratadas en la Clínica Urológica de Belgrado, de enero de 1945 a enero de 1952. De estas, 105 fueron rupturas y 65 heridas uretrales. Se describen el tratamiento, métodos y resultados en 100 casos de suptura uretral. Se revisan la localización y mecanismo de las rupturas. Se discuten la significación de la modificación patologica periuretral, tipos y grados de la lesión uretral y el desarrollo subsecuente. Se señala la influencia de estos factores sobre la decisión del cirujano en lo que atañe a los métodos de tratamiento. La estadística, aun cuando muestra un gran porcentaje de casos con emisión espontánea de orina, indica también la importancia de la cistostomía en casos de retención.

RIASSUNTO E CONCLUSIONI

Fra il gennais del 1945 e il gennaio del 1952 sono state curate 170 lesioni dell'uretra nella Clinica Urologica di Belgrado. Di queste, 105 erano rotture e 65 ferite. Nel lavoro vengono descritti la cura, i metodi e i risultati di 100 casi di rottura dell'uretra, e vengono passati in rassegna sede e meccanismi della lesione. Viene discusso anche il significato delle modificazioni patalogiche periuretrali, il tipo e la gravità della lesioni e gli sviluppi successivi. Viene sottolineata l'importanza di questi fattori nell'opera del chirurgo, con particolar riguardo ai metodi di cura. Le statistiche, pur dimostrando che in una grande percentuale di casi la minzione riprende spontaneamente, mostrano pure che la cistostomia è indicata nei casi di ritenzione.

ZUSAMMENFASSUNG

In der Belgrader Urologischen Klinik wurden von Januar 1945 bis Januar 1952 170 Faelle von Verletzungen der Harnroehre behandelt. Darunter befanden sich 105 Zerreissungen und 65 Wunden der Harnroehre. In der vorliegenden Arbeit werden die Methoden und die Ergebnisse

der Behandlung in 100 Faellen von Harnroehrenzerreissungen beschrieben. Es wird ein Ueberblick ueber den Sitz und den Mechanismus der Risse gegeben. Die Bedeutung krankhafter Veraenderungen im periurethralen Gewebe, die verschiedenen Formen und Grade von Harnroehrenverletzungen und die daraus folgenden Entwicklungen werden eroertert. Es wird betont, dass diese Faktoren von Einfluss auf die Entscheidung des Chirurgen hinsichtlich der einzuschlagenden Behandlung sind. Die Statistiken zeigen zwar, dass in einem hohen Prozentsatz der Faelle spontane Harnfunktion eintritt, beweisen aber auch, dass die Anlage einer Harnfistel in Faellen von Harnverhaltung wichtig ist.

SUMARIO

Cento e setenta traumas uretrais foram tratados na Clinica Urologica de Belgrado entre Janeiro de 1945 e Janeiro de 1952. Deste numero, 105 foram roturas e 65 foram feridas da uretra. Este trabalho descreve o tratamento, metodos e resultados de 100 casos de rotura da uretra. Uma rapida vista épassada sobre a localização e mecanismo das roturas. A significação das alterações patologicas periuretrais, os tipos egrans de traumatismo uretral e o seu subsequente desenvolvimento são discutidos. E realçada a influencia desses fatôres sobre a decisão do operador em relação aos metodos de tratamento a serem escolhidos. As estatisticas, ainda que mostrem uma larga procentagem em que a micção expontanea ocôrra, mostram tambem a importancia da cistostomia em casos de retenção.

RÉSUMÉ

170 cas de maladie de l'urêthre ont été traités à l'hôpital Belgrade Urologic Clinic entre janvier 1945 et janvier 1952. Sur ce nombre, 105 cas de rupture et 65 cicatrisés. L'auteur expose le traitement, les procédés, et les résultats de 100 cas de rupture. Ensuite, il donne son idée de l'examen quant à la localisation et le mécanisme des ruptures, les changements pathologiques éventuels, le genre de maladie et le développement subséquent. Tout ceci influence le chirurgien quant au procédé à suivre. Les statistiques ont montré que la miction est apparue spontanément après ce traitement, dans un bon nombre de cas, et elles aussi démontrent l'importance de la cystostomie dans les cas de rétention.

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Correction: The Journal regrets to announce that, owing to an error in printing, the name of Dr. Anthony J. Mendillo, F.A.C.S., F.I.C.S., did not appear as senior author of the article "Mesenteric Chylous Cysts," which, with Drs. R. R. Lowman, L. L. Waters and H. W. Stanley, he contributed to the September issue of the Journal.

The Efficacy of Sleeve Anastomosis of the Hollow Viscera

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BY sleeve anastomosis is meant the implantation of the proximal portion of a severed common bile duct, ureter, or esophagus into the distal portion of the hollow viscera. This type of anastomosis is useful in cases of obstruction of the common bile duct due to carcinoma of the head of the pancreas or after injury of the common duct following cholecystectomy. It is an ideal procedure in the anastomosis of the esophagus to the stomach or jejunum and in cases of congenital bronchoesophageal fistula, in which there is usually enough esophagus to perform a sleeve anastomosis. There will be less likelihood of leakage in this type of anastomosis than in the classic end-to-end anastomosis because stitches do not hold well in the esophagus.

Brunschwig and Pierce[1] used the same method in the anastomosis of the ureter to the colon. Instead of one anchor suture they used two placed laterally. A. A. Strauss[2] attached a vitallum tube to the common duct. The tube was drawn through the intestinal tract by means of a forceps. James Burnett Hogarth[3] used a form of sleeve anastomosis with the aid of a corkscrew and an angled forceps. Haight[4] employed what he called a telescoping method of joining the esophagus in cases of congenital broncho-esophageal fistula (Fig. 2). The same method can be used when a carcinoma is excised from the esophagus, after which the jejunum or stomach is anastomosed to the esophagus. Berman[5] used a plastic tube which is substituted for the excised esophagus to complete the junction of the distal and proximal ends of the esophagus (Fig. 3). Binckley, Palmer and Hogarth[6] performed many experiments on dogs, using the sleeve anastomosis, with which they were successful in preventing leakage. They prefer not to use rubber or metal supports.

Technic.—After the proximal portion to be anastomosed has been mobilized, a suture is passed through all its coats. An incision is then made in the viscera to be anastomosed. The free end of the suture is now threaded with another needle. Both needles are passed within the intestine through the incision and emerge through all the coats about ¼ inch (0.6 cm) apart. This suture draws the proximal portion into the lumen of the distal portion. The ends are tied on the serous surface which acts as the anchor suture. The apposing serous surfaces are sewn with interrupted atraumatic sutures of silk or linen. This method of anastomosis is a positive way of preventing leakage because the proximal and distal portions fit snugly into each other. No rubber tubes or other foreign materials are used in this operation (Fig. 1).

If a sufficient length of the common bile duct remains after injury following cholecystectomy, it is dissected from its bed and the operation completed as described. In cases of obstruction of the common bile duct due to carcinoma of the head of the pancreas there is always enough of the duct available to invaginate it into the stomach, duodenum or jejunum. The following cases illustrate the point.

REPORT OF CASES

E.C.F., a woman aged 22, was admitted to the Jewish Hospital (now Albert Einstein

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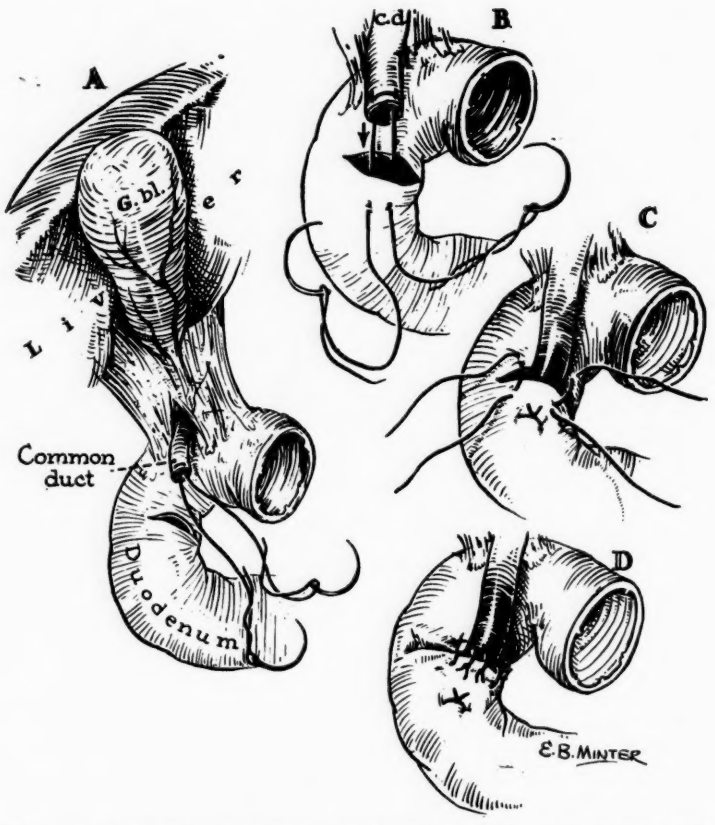

Fig. 1.—*A*, illustration of sleeve anastomosis, showing gall bladder with the common duct dissected free for implantation into the duodenum. *B*, the stitch, which is double-thread, placed through the layers of the common duct. *C*, method by which the double-threaded stitch is next passed through an incision in the duodenum and tied on its serous surface. The common duct is anchored within the duodenum. *D*, invagination of the common duct into the duodenum, with additional Czerny-Lambert sutures placed through the serous coats.

Medical Center—Northern Division) on Dec. 22, 1942. The chief complaint was abdominal pain and jaundice for three weeks. The pain was referred to the back and appeared at intervals. Light-colored stools were present. Itching accompanied the jaundice. Physical examination gave negative results except for the fact that the edge of the liver could be felt on deep inspiration. In addition, Courvoisier's sign was present and a large pyriform mass could be palpated in the right upper abdominal quadrant. The direct van den Bergh reaction was strongly positive; the indirect, — 9.7 mg. The feces contained no bile. The first operation was a cholecystojejunostomy performed on Feb. 20, 1943. At this operation the head of the pancreas was so hard as to make one suspicious of carcinoma of the head of the pancreas. A piece of the pancreas was taken for biopsy, and the pathologic report revealed chronic pancreatitis.

After the primary operation there were many complications, and eight additional operations were performed. For these, the reader is referred to the bibliography.[7] Suf-

fice it to say that the ninth and final operation, performed on March 10, 1944, was a choledechogastrostomy using the sleeve type method of anastomosis, with the aid of a T tube. After this operation the jaundice entirely disappeared, and the patient has remained well up to the time of writing.

L.J., a woman aged 65, was admitted to the Jewish Hospital on Aug. 11, 1950, and discharged September 9. The chief complaint was epigastric pain radiating to the right upper quadrant and especially severe one to two hours after eating. The patient had complained of these symptoms for the past twenty years and during this time had lost 30 pounds (13.6 Kg.) in weight. Notwithstanding the loss of weight she seemed to be in good physical condition, except that her electrocardiogram indicated chronic fibrillation. A cholecystogram failed to visualize the gallbladder. Cholecystectomy was performed on August 17, and a stone in the common duct was removed. A choledochostomy was performed and T tube drainage instituted. The T tube was removed from the duct, which continued to discharge bile.

The patient was readmitted on Jan. 10, 1951, and discharged January 28. She had continued to drain enormous amounts of bile since the operation in August 1950. She had no acute distress but was compelled to change her dressings very often on account of the bile drainage. The second operation was performed on January 12. At this time, immediately under the skin a tube was found which looked like the common duct. This was dissected down to the porta hepatis of the liver. Bile was pouring from this tube-like structure. After the duct was completely isolated, a small incision was made in the duodenum and a sleeve anastomosis performed as illustrated (Fig. 1). A piece of fat was sewn over both sides of the duct. The operation performed was a choledochoduodenostomy.

SUMMARY

The superiority of sleeve anastomosis of the hollow viscera in certain locations is described.

The common bile duct, ureters and esophagus are suitable structures for this type of anastomosis.

The technic is described.

ZUSAMMENFASSUNG

Die Ueberlegenheit der Aermelanastomose gewisser Hohlorgane wird beschrieben. Fuer diese Form der Anastomose eignen sich der Choledochus, die Harnleiter und die Speiseroehre.

Die Technik wird beschrieben.

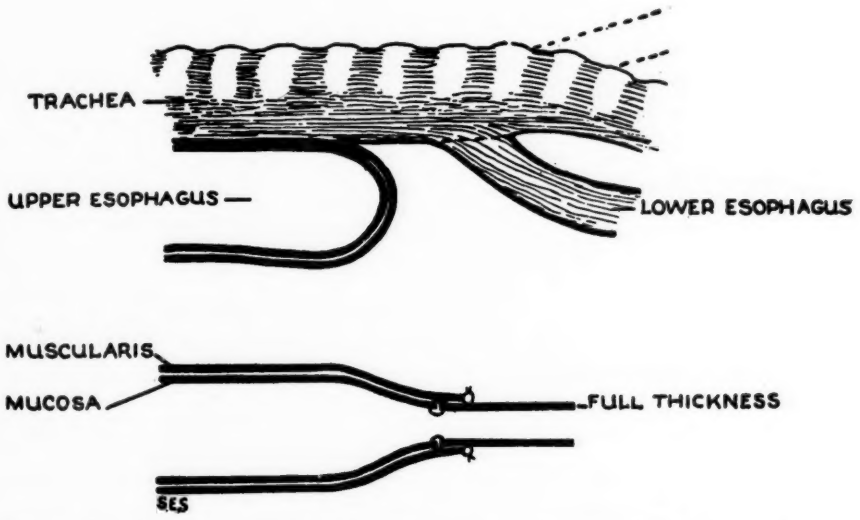

Fig. 2.—Telescoping operation of Cameron Haight. The same principles and technic are used here as in performing a sleeve anastomosis.

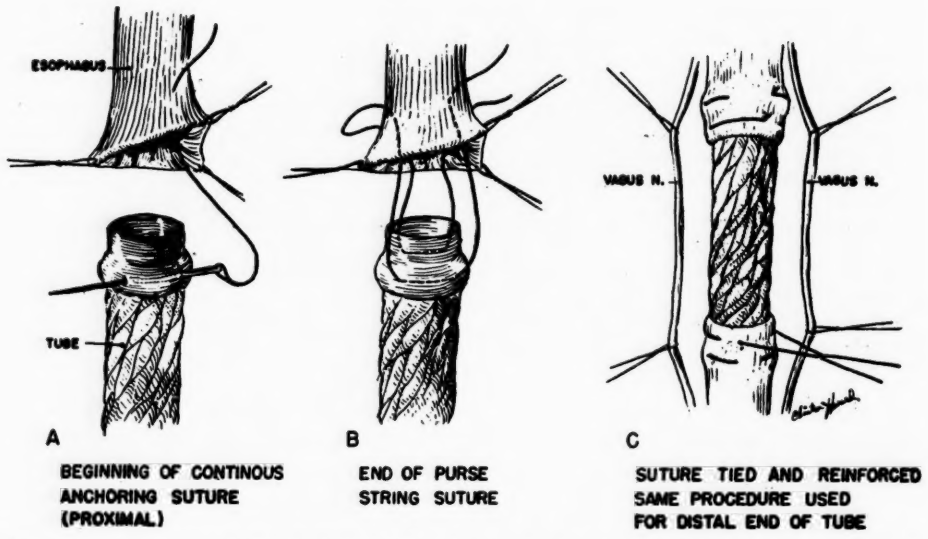

Fig. 3.—Berman uses a similar technic in the placement of a plastic esophagus when a section has been removed from this structure because of stricture or cancer.

SUMARIO

A superioridade da anastomose em manga de visceras ôcas em certas localizaçoes é descrita. O coledoco, ureteras e esofago são estruturas adequadas para este tipo de anastomose. A tecnica é descrita.

RESUMEN

Se describe la superioridad de la anastomosis en manguito de la víscera hueca en ciertas localizaciones. Se consideran adecuadas para este tipo de anastomosis la vía biliar, los uréteres y el esófago. Se describe la técnica.

RIASSUNTO

Viene descritta la vantaggiosa tecnica della anastomosi a manica dei visceri cavi in certę sedi.

Coledoco, uretere ed esofago sono visceri che si prestano a questo tipo di anastomosi.

RÉSUMÉ

L'auteur décrit la supériorité de l'anastomose de certains viscéres dissimulés. La vésicule biliaire, les uretères et l'eosophage sont des conduits propres à ce genre d'anastomose. L'auteur décrit la méthode de procédé.

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Anal Ileostomy and Complete Colectomy for Familial Polyposis of the Colon

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WHEN one recalls the distressing skin excoriations associated with abdominal ileostomy prior to the introduction of the Rutzen bag, one is reluctant to attempt an anal ileostomy unless sufficient sphincter control can be assured to avoid such complications in the perineum. The question of just what anatomic structures it is necessary to preserve to retain sphincter action with satisfactory bowel control is not yet finally solved. Devine[1] expressed the opinion that an external cuff of the lower rectal wall, in addition to sentinel areas of the rectal mucosa, and the complete internal and external muscles are essential. Ravitch, whose earlier experimental work on dogs[2] and later clinical trial on man[3] did much to encourage the introduction of this procedure, resected the rectal mucosa down to the anorectal line and then severed the remainder of the bowel wall just above the upper level of the internal sphincter muscle. Bacon,[4] in his "pull-through" procedure for resections of the colon, cautioned against the error of dissecting through a cleavage plane between the internal and external sphincter muscles, thereby failing to preserve the internal sphincter muscle. Black,[5] in his modifications of Bacon's operation, advised preserving an additional inch or two of the lower rectal mucosa above the pectinate line to retain the sensory mechanism and improve the function of the sphincter muscles. The preservation of sentinel areas or of mucosa above the pectinate line in cases of familial polyposis is objectionable, as potentially malignant tissue is left.

Heredity.—Familial polyposis, the condition for which we employed anal ileostomy, was first described by Menzel in 1721 and later by Lebert in 1861 and Virchow in 1863. It is a rare inheritable disease, which may be transmitted by either sex to both sexes.[6] In approximately half of the cases of polyposis of the colon there is no significant family history,[7] as the condition may skip a generation only to reappear later,[8] and often the patient does not know the cause of his predecessors' death. Wakefield, cited by Black,[9] expressed the opinion that even sporadic polyposis may be transmitted to succeeding generations, as well as the type in which 2 or more instances occur in one family.

Age.—The youngest patient recorded was the patient in a case reported by Le Fevre and Jacques,[10] an infant 4 months old. Ravitch,[11] reported the case of a 10-month-old infant with polypoid involvement of the entire intestinal tract. McKenny,[12] who observed multiple polyps in a 2-year-old child and progressively larger ones in 3 other members of the same family (aged 5, 9, and 11 years respectively) was of the opinion that the disease is also congenital. However, Mayo,[13] in his recent excellent review of this subject, was unable to find any cases in which polyps were noted in the newborn. Although in Mayo's series of 95 cases the ages of the patients ranged from 3 to 56 years, the condition in the majority of cases was first diagnosed in the third and fourth decades. The two sexes were about equally affected. All of Mayo's 95 patients were white.

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Distribution. — In the case presented here, polyps extended, as they usually do in such cases, down to the pectinate line. In the resected specimen no polyps were observed in the terminal portion of the ileum. Some unsatisfactory results of anal ileostomy in the presence of ulcerative colitis may be due to the fact that in some cases this process involves the lower part of the ileum as well, which we have found to be the case in one of our autopsy specimens. In general, polyps are usually limited to the colon and rectum; however, the stomach and small bowel may also occasionally be involved.[14] Although it is unusual for polyps of the small bowel to become malignant,[15] those in the stomach are as likely to become cancerous as are those in the colon.[16] Occasionally only a segment of the colon may contain polyps, but segmental removal of the colon is not adequate treatment, as polyps may appear later in the remaining portion of the colon.[17]

Symptoms.—Stools with blood and mucus, intermittent diarrhea and occasional attacks of cramplike abdominal pain are the usual symptoms of this disease. Symptoms referable to the colon may be minimal or absent for long periods after the appearance of the polyps. Polyps may first appear at almost any age[18] but occur most often during puberty.[19]

Diagnosis.—Negative results from a single proctoscopic or roentgenologic examination of a person with this hereditary trait is not sufficient, as polyps may appear in subsequent years. Physical examination of the abdomen prior to malignant change reveals no signs. On rectal digital examination these polyps are usually palpable. The double contrast barium enema, with tannic acid if necessary,[20] and the proctoscopic examination are the most reliable diagnostic procedures.

Prognosis.—The malignancy potential of polyposis is tremendous.[21] It is now a generally accepted fact that in all patients with this disease malignant change eventually develops,[22] and most of them, if untreated, die of carcinoma of the colon before the age of 50.[23]

Treatment.—Until recently the procedure most commonly employed for familial polyposis was resection of the entire colon down to the rectosigmoid level and anastomosis of the ileum to the remaining rectosigmoid colon.[24] The polyps in the lower part of the large bowel were fulgurated at repeated intervals. In spite of careful attempts to follow the patients in these cases, a considerable number succumbed to carcinoma of the rectum. Polyps may recur after fulguration, sometimes quite early and occasionally several years later. Treatment of polyps by irradiation has proved ineffective.[25] Complete colectomy with a skin-grafting ileostomy of the Dragstedit type[26] and use of the Rutzen bag has been the other method employed. Ravitch[27] and others have recently reported their experiences with the use of anal ileostomy and complete colectomy for familial polyposis, and this now promises to make surgical treatment not only of familial polyposis but of ulcerative colitis (in selected cases) more acceptable both to the patient and to those clinicians who look with disfavor upon ileostomy.

REPORT OF A CASE

The patient, a 29-year-old white housewife and stenographer, consulted her family physician in December 1950 because of extreme fatigue and weakness of one year's duration. Her tongue was sore and red. She had noted a sallow, yellowish tinge of her skin for months. Occasionally the gums bled slightly. She had slight paresthesias in her legs. She had lost a few pounds in weight. The bowel habits had not changed in recent years. Occasionally there had been a few loose stools, with a slight amount of mucus, but no blood had been noted. There had been recurrent attacks of cramplike pains across the lower part of the abdomen, principally on the right side, which were relieved by bending forward.

In 1942 she had phlebitis of the left leg, complicated by a pulmonary embolism. In 1947 varicose veins of the left leg were ligated, and since that time there had been slight edema of both ankles. The menstrual periods were irregular and scanty. The patient was sensitive to iron compounds and

certain foods which would produce diarrhea.

The family history was very significant. The patient's mother had died of cancer of the rectum at the age of 44, and her grandmother had died at the same age of the same disease. The patient is a member of a family of 10 siblings; 3 were stillborn. The patient was advised as to the nature of her condition and urged to have the other members of her family, who lived in Canada, examined. Three of her four sisters were heard from. In a sister aged 27, two years younger than our patient, the same condition was discovered. She has since been operated upon in Canada, and a complete colectomy with an abdominal ileostomy was performed. In the second sister, aged 24, polyposis was also present. A colectomy down to the rectosigmoid level was done, and the ileum was anastomosed to the rectum. Polyps in the rectum were fulgurated and the patient instructed to return for observation and further fulguration. The third sister, aged 20, was examined, and it was reported that only small "blisters" were visible in the colon. No reports have been received from the remaining sister or the two brothers.

Physical Examination: The patient was pale but well-nourished. Her afternoon temperature occasionally rose to 99.2 F. The tongue was furrowed and slightly red. The heart and lungs were normal. The pulse rate was 88. The liver and spleen were not enlarged. Abdominal examination revealed no masses, no rigidity and no localized tenderness. There were a few varicosities in the legs. On rectal examinations numerous polyps were palpable throughout the rectum, but no areas of induration or infiltration could be detected.

A proctoscopic examination on March 19, 1951, revealed multiple polyps, some sessile and some pedunculated, varying in diameter from several millimeters to 1 to 3 centimeters. On the posterior wall of the rectal ampulla the mucosa was puckered in one small area, suggesting possible early malignant change. Otherwise, no gross malignant disease was observed. The polyps extended down to the pectinate line.

Roentgen Examination.—Repeated barium enemas with an air contrast medium in March disclosed multiple polypoid, pedunculated intraluminal masses in all parts of the colon, from the hepatic flexure to and including the rectal mucosa. Visualization of the colon proximal to the hepatic flexure was unsatisfactory on repeated examinations, owing to retention of the barium in this area, although signs suggestive of polyps were present also in the ascending colon.

Roentgenograms of the upper part of the gastrointestinal tract revealed no abnormality except for a pouch diverticulum of the proximal part of the lesser curvature of the stomach and generalized hypomotility. No polyps could be demonstrated in the stomach or the small bowel.

Laboratory Data.— Examination of the urine and a Wassermann test of the blood yielded normal results. Even in September 1947, when the patient had been hospitalized for thrombophlebitis, her record revealed anemia, with a hemoglobin level of 8.9 Gm., or 59 per cent; an erythrocyte count of 3,500,000 per cubic millimeter of blood, and a leukocyte count of 8,300, with 47 per cent polymorphonuclears, 8 per cent eosinophils, 2 per cent basophils, 37 per cent lymphocytes and 3 per cent monocytes.

Preoperatively, on March 13, 1951, the value for hemoglobin was 7.9 Gm., or 53 per cent. The erythrocyte count per cubic millimeter of blood was 3,290,000; the leukocyte count, 8,300. The value for blood calcium was 9.9 mg. per hundred cubic centimeters; the prothrombin content, 83 per cent, and the basal metabolic rate, plus 10. On the day before the operation, after several transfusions, the erythrocyte count was 4,830,000, with 83 per cent hemoglobin; the leukocyte count was the same as before, with 8 per cent eosinophils.

These data and the family history led to the conclusion that this was a case of familial polyposis of the colon, with a bad prognosis unless the entire bowel was resected.

On the basis of recent reports in the literature, especially those by Ravitch, it was decided to do a two-stage complete colectomy, with resection of the lower part of the colon and an anal ileostomy as the first stage. The patient was told that if she regretted the ileostomy it could be converted to an abdominal ileostomy at the second operation.

Operation.—First Stage (March 22): A left paramedian incision was made from 1 inch (2.5 cm.) above the umbilicus to the pubis. When the abdomen was opened, the gross appearance of the colon was normal, and it was difficult to palpate and identify the polyps as such. No gross malignant change was observed. The colon was mobilized from the upper third of the descending colon

to within about 8 cm. from the anal region. A tube of ileum was then prepared, the ileum being clamped and severed about 10 cm. from the ileocecal valve. The mesentery of the ileum was severed for a distance of about 25 cm. upward but was left 5 cm. wide in order to preserve its circulation. Both ends of the ileum were closed.

The abdominal incision was then temporarily closed with a gauze pack and one through-and-through wire suture.

The patient was placed in the lithotomy position, the anal sphincter muscles widely dilated and the rectum cleansed and packed with gauze saturated with tincture of merthiolate.

An incision was then made through the mucosa at the pectinate line, and the mucosa was dissected off the lower rectal wall upward for a distance of about 5 cm. At this level the outer rectal wall was severed, and the rectum and colon were then drawn down through the anal cuff, the lower end of which was covered with a rubber dam.

The abdominal incision was then reopened, and, with one surgeon working above and one below, the colon and rectum were pulled up into the abdomen and the ileum passed down through the anal cuff. A few mattress sutures of catgut were placed through the mesentery of the ileum to fix it to the posterior pelvic wall. A vertical incision for drainage was made through the upper posterior portion of the vaginal wall, and three Penrose gauze drains were introduced through it into the pelvis.

A small transverse incision was made in the left upper portion of the abdominal wall and the freed colon brought out through it and resected, its proximal end being left open as a temporary nonfunctioning colostomy.

The peritoneum was then very loosely approximated about the ileum to reconstruct the pelvic floor. The abdominal incision was closed in layers with catgut and wire retention sutures. A few fine atraumatic sutures were placed from below through the protruding mesentery to the anal margin to prevent retraction.

Postoperative Course.—Considerable apprehension was felt immediately after completion of the first stage, although the patient's general condition was excellent. In spite of the fact that the anal sphincter had been widely dilated digitally, and even though the color of the terminal part of the ileum, prior to its being pulled through the anus, had been good and great care had been taken to preserve its blood supply, the protruding ileum had a dark, dusky bluish color, and its viability appeared questionable. We were tempted to sever the anal sphincter completely, but we did not, as the appearance of the ileum before closure had been so good. About 10 cm. of the ileum protruded beyond the anus. Removal of the temporary ligature at the end of the protruding loop and insertion of a mushroom catheter deflated the bowel and slightly improved its color. Oxygen was given intranasally, which may also have improved it slightly. The patient was kept on her side with two pillows between her knees, and pressure and kinking of the protruding bowel were carefully avoided. A stomach tube was inserted and suction employed.

On the *first* postoperative day the distal portion of the bowel was definitely undergoing dry necrosis, but the color of the proximal 5 cm. had improved. The vaginal drains were removed on the first day. A moderate serosanguineous discharge from the vagina continued for three days.

On the *second* postoperative day the ileum was dry and necrotic up to 3 cm. from the anus. The stomach tube was withdrawn because it distressed the patient considerably. About 3 ounces (85 Gm.) of bloody discharge came through the mushroom catheter from the protruding ileum. The patient had very little pain; the temperature was 100 F., and the pulse was good.

On the *third* day nausea and vomiting occurred, and gastric suction was restarted. The patient had voided spontaneously off and on since the operation, but when catheterized had retained 650 cc. of urine.

On the *fourth* day the ileum was dry and black up to 2 cm. from the anus. Moderate abdominal distention was present. A few peristaltic sounds were audible. No gas and no stool had as yet passed spontaneously through the ileostomy. The mushroom catheter was removed and a well-lubricated small rectal tube was passed up into the terminal part of the ileum through the analsphincter. About 600 cc. of liquid, dark, bile-stained stool and a considerable amount of gas escaped, with relief of the discomfort and distention.

On the *fifth* day only about 0.5 cm. of viable ileum protruded. The temperature was normal. The patient vomited her breakfast that morning. The abdomen was slightly distended.

Intermittently, a little gas and a small

amount of bile-stained liquid stool were expelled spontaneously. The rectal tube was again passed and a large liquid bile-stained stool obtained.

Progressive improvement then occurred. On the *eighth* day the protruding ileum and its attached mesentery were trimmed. About 1.5 cm. of ileum was left, the edges of which bled so freely that ligation was necessary. Off and on, all that day, the patient expelled liquid and slightly formed stools. Although she had very little control, she did "get a warning" shortly in advance of each stool. She was eating well and voiding satisfactorily. There was no vaginal discharge.

On the *eleventh* day, excoriation of the skin of the buttocks had become very troublesome.

On the *twelfth* day the retention sutures were removed from the abdominal wound, which was clean and healed. The patient then could go as long as two and a half hours without a bowel movement. The stools were light brown and varied from liquid to thin. The patient was kept in bed for two weeks because of fear of retraction of the ileum.

She was dismissed on the nineteenth postoperative day, at which time she was ambulatory and afebrile and felt strong. The skin of the buttocks was very red, tender and moderately painful. Numerous measures were tried to control the skin irritation. It was found that vaseline and zinc oxide paste, alone or with fuller's earth powder, afforded the most relief. Liquid stools were passed at intervals of one to two an hour.

After the patient's return home rapid improvement occurred, so that two months after the first operation, when she returned to the hospital for the second stage, the perianal skin was well healed and she had usually seven to eight soft stools daily. She had recovered sufficient confidence in her bowel control to go to a motion picture that lasted two hours.

When asked if she desired to have the anal ileostomy converted to an abdominal one at her final operation, she was emphatic in her choice of the anal site.

Second Stage (May 15, 1951): The colostomy opening in the left side of the abdominal wall was first closed by making transverse incisions through the adjacent skin and suturing the skin over it tightly. This incision was then extended transversely across the entire abdomen, the umbilicus being excised because of a small umbilical hernia. Palpation of the remaining large bowel revealed no grossly suspicious malignant lesions. A few enlarged glands were present, adjacent to the ascending colon. The omentum was freed from the transverse colon and retracted upward. The remaining colon, the attached portion of the ileum and the appendix were then resected. The raw surfaces were peritonealized. Examination of the terminal portion of the ileum, which had been brought down through the anus, showed it to be hypertrophied. Its walls were about twice as thick as normal and the caliber of the bowel was about double its normal size. There were a few adhesions of the small bowel, but no evidence of obstruction was detectable. The pelvic floor had sealed itself securely. The abdomen was closed in layers without drainage, catgut and stainless steel retention sutures being employed.

Pathologic Data. — Histologic examination of those polyps most likely to be malignant showed them to be composed of mucosal glands lined by tall columnar epithelium. The nuclei in this epithelium were hyperchromatic and slightly larger than normal. In some sections anaplasia and pleomorphism were present, which was interpreted as indicating malignant degeneration. There was no evidence of infiltration. Sections of all of the lymph nodes showed no evidence of metastatic tumor. The specimens removed at the first and second operations were examined by different pathologists. Their interpretations were identical. (Histologic studies in other cases of polyposis invariably reveal similar results. If such observations are to be interpreted as malignant change, the incidence of carcinoma in polyposis approaches 100 per cent.[28])

Immediately after the second operation, bowel control was lost for about one week, but was gradually regained. The patient was urged to exercise the perineal muscles as suggested by Kegel's technic.[29] Apparently this procedure was of considerable help in achieving further control.

Three months after the first operation, there were seven to eight formed stools per day and one to three at night, the latter occurring without control. A diaper dressing reinforced with cellucotton was worn at night. The patient was able to control her bowel movements well during the day unless there was some unusual urge due to poorly tolerated foods.

The following foods were well tolerated:

white bread, noodles, tapioca, butter, peanut butter, tea, coffee, jello and ice cream. Meat, in small portions, was eaten without difficulty. Some vegetables and fruits, such as peas, string beans, eggplant, artichokes and bananas, agreed with the patient; other vegetables and fruits, especially oranges, produced loose stools. Crude vitamins caused loose movements, but refined vitamins did not. Nickel pectinate controlled the diarrhea most efficiently, and charcoal relieved the occasional flatulence.

At first the mucosa of the ileum tended to protrude with bending or long standing. At first, to correct this, it was necessary for the patient to lie or sit down for one hour. Three months after the first operation it disappeared on sitting for a few minutes. Injection of the protruding submucosa with a sclerosing agent was discussed but not tried, as the protrusion gradually subsided. There was a tendency for the protruding mucosa to bleed with each bowel movement, but this too gradually diminished. Three months after the first operation the patient was doing all of her own housework. She had been out to two dinners and one motion picture without embarrassment.

The patient returned to her previous occupation as a stenographer five months after the first operation. At that time she had good control during the day but poor control at night. The anal skin was normal. One soft, pastelike stool would be passed after breakfast, and during the day the patient would go to the lavatory only once or twice to expel gas, of which she was warned by a sense of distention. On returning home in the evening she had two or three small movements both before and after dinner, soft and pastelike. At night she had poor control; she would pass two or three small stools while asleep, and had to wear a cellucotton diaper.

One year has now elapsed since the operation. The patient has good control during the day, but control is still poor at night. She now has one soft pastelike stool after breakfast, occasionally one in the late afternoon, and several after dinner. At night she loses control, is obliged to wear a diaper, and occasionally a stool weighing as much as 5 ounces will escape. She has worked as a stenographer without interruption or embarrassment. She is very grateful for the anal ileostomy.

Examination of the anal region now, one year after the operation, reveals normal anal skin. (A recent acute infection of the upper part of the respiratory tract, complicated by acute enteritis, has produced again what we hope is a temporary exacerbation of anal excoriation.) The anal sphincter feels strong, and the patient is able to contract it voluntarily with considerable force. However, the line of anastomosis between the ileum and the anal skin has now retracted upward, and a stricture-like condition exists at the anorectal line. A similar condition was described by Dixon,[30] as occurring in low anterior resections, and was once also encountered by ourselves. The bowels move satisfactorily in spite of this, and Dixon found dilatations neither necessary nor desirable.

COMMENT

Complications of anal ileostomy, in the few cases reported in the past, have been infection in the pelvis and obstructive symptoms, probably due to kinking of the ileum as it passes through the pelvis to the anus.

In our patient, to avert infection, the hollow of the sacrum was drained for twenty-four hours through a longitudinal incision in the upper posterior portion of the vaginal wall. To avoid introduction of infection at the anal margin, the protruding loop was left long. Care was exercised to prevent contamination during the operation by packing the rectum with gauze saturated with merthiolate solution. No infection occurred. Antibiotics and sulfasuxidine were employed preoperatively and postoperatively to sterilize the colon.

The viability of the protruding ileum was a matter of serious concern. Wide dilatation of the anal sphincter obviously is essential. Opening its distal end to avoid distention appears to be advantageous. The fear of retraction, which has occurred in other "pull-through" procedures, deterred us from permitting early ambulation.

Distention of the lower part of the abdomen did develop on the fourth postoperative day. The passage of a rectal tube up through the protruding ileum resulted in expulsion of a large liquid bile-stained stool as soon as the tube was passed be-

yond the sphincter muscle, which already was competent enough to prevent its escape. The distention subsided.

Cramplike abdominal pains, persisting for some time after the operation, also described as sequelae of this procedure, were absent in our case.

The synchronous approach, using the Loyd-Davis position and stirrups, which permit simultaneous operation from the abdominal side at the same time it is proceding from the anal side, enables one to draw the ileum through the pelvis and out through the anus without exerting undue tension and without kinking it, thus avoiding obstruction. Hemorrhage, due to ligatures slipping off the vessels of the ileum as it is brought down, also is less apt to occur. Since these stirrups are now available, we intend to use them for this purpose in the future.

A carefully selected postoperative diet is necessary to solidify the stools.

Exercising the perineal muscles, as advocated by Kegel, for stress incontinence of the urine, may aid in the recovery of anal sphincter tone.

SUMMARY

Anal ileostomy, its technic and application to the problem of familial polyposis, is discussed. A case of familial polyposis is presented.

The result of this case was satisfactory and leads the authors to the conclusion that when complete colectomy is indicated, as in familial polyposis or selected cases of ulcerative colitis, it is a procedure worthy of consideration. More experience with it is, of course, needed.

RÉSUMÉ

On nous présente la technique de l'iléotomie anale, son application dans les polyposes. Le résultat du traitement est satisfaisant et amène l'auteur à conclure que ce procédé est très bien dans les cas de polyposes ou dans quelques cas de coliques ulcéreuses. L'expérience cependant est à acquérir.

ZUSAMMENFASSUNG

Die Ileoanostomose, ihre Technik und ihre Anwendung bei familiaerer Polypose wird eroertert. Ein Fall der Erkrankung wird dargestellt. Hier war der Erfolg befriedigend und veranlasste die Verfasser zu der Schlussfolgerung, dass, wo eine totale Dickdarmresektion angezeigt ist, wie bei familiaerer Polypose oder in ausgewahlten Faellen von ulzerierender Kolitis, die Ileoanostomose Berucksichtigung verdient. Natuerlich sind weitere Erfahrungen mit der Methode notwendig.

RESUMEN

Se discuten la ileostomía anal, su técnica y aplicación al problema de la poliposis familiar y se presenta un caso. El resultado de este caso fué satisfactorio y condujo a la conclusión que, cuando la colectomía total se encuentra indicada, como en la poliposis familiar o en casos seleccionados de colitis ulcerosa, el procedimiento es merecedor de consideración. Desde luego, se necesita mayor experiencia al respecto.

SUMARIO

E discutida a ileostomia anal, sua tecnica e aplicação ao problema da polipose familial. Um caso de polipose familial é apresentado. O resultado deste case foi satisfatorio e levou os autôres a conclusão de que, quando a colectomia total é indicada, como na polipose familial ou em casos de colite ulcerativa, é um porcesso digno de donsideraçao. Maior experiencia com ele, é, naturalmente, necessaria.

RIASSUNTO

Discussione sull'ileo-stomia anale, sua tecnica ed applicazioni alla poliposi famigliare. Presentazione di un caso.

Il risultato, nel caso presentato, fu soddisfacente e consent-e di trarre la conclusione che, quando è indicata la colectomia totale, come nei casi di poliposi famigliare, o di colite ulcerosa, il metodo

è degno di considerazione. Occorre, naturalmente, una maggior esperienza di esso.

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To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the *Journal* to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the *Seccion en Espanol,* which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

The Phrenic Nerve in Surgery

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KEEN interest was awakened in the phrenic nerve among clinicians after Stuertz'[1] publication of his work on phrenicotomy for the treatment of tuberculosis in 1911. Stuertz's article was followed by a series of reports on the efficacy of this procedure as an adjunct to other forms of therapy for pulmonary tuberculosis. Sauerbruch,[2] Oehlecker[3] and Schepelman[4] reported cases in 1913. Felix's[5] extensive work in 1922 may be considered to have placed the subject on a sound anatomic and physiologic basis. It was Felix who first performed exeresis by cutting the nerve, winding it on an artery forceps, then evulsing it from the thorax. It was he also who first supplied the anatomic basis for discordant effects after phrenic resection. E. J. O'Brien,[6] Matson and Plenk,[7] and many others made follow-up studies on the anatomy of the nerve with especial reference to anomalies. There is no end to the number and variety of these.

Among the publications that appeared on the subject of phrenicotomy are those by Goetz and Ruherman in Germany (in addition to those of Stuertz and Sauerbruch); Saugman, Gregerson and Jacobaeus in the Scandinavian countries; J. Alexander, Howard Lilienthal and Willy Meyer in the United States; Cortes and Meyer in Spain; Sayago in the Argentine Republic; Morone, Quasti and Berle in Italy; Toussaint, Combresier and Moreau in Belgium; Bourrand, Roux, Cardis and Morin, and Spengler and Screibse in Switzerland (cited by Berard, Dumarest and Desjacques).[8] In France, Berard, Dumarest and Desjacques in 1933 published an extensive monograph,[8] "La Phrenicectomy", which gives an exhaustive survey of the entire subject to that date.

My own earliest clinical contact with the phrenic nerve occurred during the years 1917 to 1919, while my associates and I were working with tuberculous patients in Asheville, North Carolina. The role of the phrenic nerve in relation to the treatment of tuberculosis is now practically a closed book, and our interests several years ago were transferred to a study of this nerve from other surgical aspects. Phrenic nerve crush and phrenicotomy, unilateral and bilateral, for hiccough, for hiatus hernia and, in certain cases, for cardiospasm were carried out from time to time by my associates and me, with favorable results in the main, and in some cases with dramatic success. These experiences form the clinical background for later laboratory investigations.

Sporadic anatomic and experimental investigations over the years were replaced by controlled studies when my former resident and present associate, Nelson C. Jefferson, became a member of the staff of the Department of Gastrointestinal Research, Medical Research Institute, Michael Reese Hospital, Chicago, under the directorship of Dr. Heinrich Necheles.*

From the beginning of Jefferson's collaboration with Dr. Necheles, the object of study was the relation of the phrenic and the vagus, as well as the sympathetic nerves, to gastrointestinal mechanisms. Reports of these investigations have appeared in detail in a series of publications.[9] This work and its clinical applications are part of a new chapter in this

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*Later associated in this work were my former surgical residents, Clyde C. Phillips and Morris M. Proffitt, now of the Surgical Faculty of Howard University, Washington, D. C.

field of surgery and form the thesis of the present communication.

Résumé of Laboratory Experiments.—1. In an attempt to produce peptic ulcer in the dog, Jefferson and his co-workers made anastomoses (loc. cit.) between the central end of the left phrenic nerve and the distal stump of the left vagus nerve. It was thought that the constant discharge of respiratory impulses from the vagus into the stomach would lead to a type of irritation similar to that which is believed to produce peptic ulcer in man. The first dog thus operated upon died ten months after the operation. Ten ulcers were observed at autopsy, and the stomach was enormously dilated. Not all of the animals similarly operated upon showed multiple ulcer formation. In all of them, however, within eighteen to twenty months, a functioning anastomosis had formed between the left phrenic and vagus nerves. In "acute experiments," stimulation of the phrenic nerve above the anastomosis was followed by distinct contractions of the stomach. The expected rhythmic respiratory contractions did not occur, but the emptying time of the stomach was definitely shortened. These observations were repeated many times, and were confirmed by a barium test meal and fluoroscopic study.

2. Section of the left phrenic nerve in the dog shortened the emptying of the stomach 20 to 60 per cent, with an average of 30 per cent. Fluoroscopic investigation demonstrated that the high-lying diaphragm is followed upward by the gastric fundus, straightening out the axis of the stomach and flattening the angle of the duodenum in relation to the stomach. The vertical position of the stomach thus attained favors evacuation of its contents into the duodenum.

3. After phrenic section, the diaphragm was found completely atrophied within fourteen to twenty months except in the presence of an accessory nerve. The belief that lumbar and sympathetic nerves can take the place of the phrenic nerve is not shared by us on the basis of many experiences. The supply of intercostal nerves around the periphery of the diaphragm does not compensate for deficiency of the phrenic. After fourteen to twenty months, regeneration of the phrenic nerve cannot reactivate a degenerated diaphragm.

4. A gastrocardiac symptom complex, Roemheld's syndrome (cardiovascular and gastrointestinal disturbances) following phrenic exeresis, was not observed in our animals. We share Noack's opinion that the syndrome is due to incidental tearing of sympathetic fibers during exeresis.

5. Bilateral vagotomy in the dog leads to great distention of the stomach. Some of the animals vomited for months, and little food was passed into the intestines.

6. In our work on vagotomy in the dog, it was our opinion that complete interruption of the vagus supply could *not* be achieved either by supradiaphragmatic or infradiaphragmatic vagotomy, as too many filaments enter the musculature of the esophagus and run inside it into the stomach. Also, and this is exceedingly important, short branches of the vagus enter the esophagus and establish synaptic connections with its intrinsic plexuses. The latter are contiguous with those of the stomach. Fibers that may not be cut in the usual vagotomy are those that pass through the celiac ganglia and along blood vessels with the sympathetic fibers into the stomach.

7. The theory that handling, as well as section, of the vagus nerves leads to atony of the stomach and loss of secretory function was tested. The left side of the chest was opened, and all visible vagus fibers were elevated gently with a smooth hook and separated for a distance of about 2 cm. from the esophagus, and the nerve was not sectioned. Extreme dilatation lasted for five months, after which time the animal was killed. A large atonic stomach was observed at autopsy, and the vagus fibers were grossly intact. This observation conforms with those made clinically when incomplete section of the

Fig. 1.—Preoperative roentgenogram of patient (L. F.) with chronic duodenal ulcer, taken in December 1949, shortly after ingestion of barium meal. The preoperative emptying time was more than seven hours. Note transverse position of stomach.

vagus has led to gastric atony and healing of the ulcer.

8. One of the most striking observations made in the vagotomized animal was that if phrenicotomy was added no vomiting occurred; the emptying time of the stomach was normal, and within a very short time the animal seemed quite normal. So great was the contrast with the distention and discomfort of the bilaterally vagotomized animal without phrenic interruption that it occurred to us to apply the procedure to man. Our own clinical results with vagotomy for ulcer had frequently been seriously marred by postoperative distention, vomiting and stasis, even when gastroenterostomy was added. It was thought that if results anything like those in the animal should accompany vagotomy plus phrenic nerve crush in man, the procedure would be a worth-while addition to the surgical therapy of ulcer.*

Résumé of Clinical Experiences.—The observation that the addition of phrenicotomy will mitigate the untoward symptoms commonly met with after vagotomy has been applied clinically in cases in

Fig. 2.—Postoperative roentgenogram of L. F., taken two weeks after bilateral abdominal vagotomy, gastroenterostomy and supplementary crush of the left phrenic nerve. This film was made less than one hour after ingestion of the barium meal. Note vertical position of stomach and evidence of prompt emptying. Both films were made with the patient in the recumbent position.

*While this paper was in preparation, the recent work of Brown and Satinsky (Functional Restoration of the Paralyzed Diaphragm Following the Cross-Union of the Vague and Phrenic Nerves, Am. J. Med. Science 222:613 (Dec.) 1951), was brought to my attention. These authors made vagophrenic anastomoses for the purpose of restoring function to a paralyzed diaphragm. The work was in connection with "polio" patients who survive and become "respiration bound", and the results were interesting. However, some of their statements are not in accord with our experience. For example, it seems to be the feeling that bilatral phrenic interruption is incompatible with life. We have long known both clinically and experimentally that complete bilateral section of the phrenic nerve is followed by no serious disturbance of the respiratory function. Although a number of authors have expressed some doubts about this, every authoritative writer on the subject has confirmed this fact. From our experimental results, we are doubtful of the possibility of the return of function of the paralyzed diaphragm in fifteen days after section of its motor nerve, even when an immediate phrenophrenic anastomosis is made.

which bilateral vagus section was performed for the treatment of peptic ulcer.[10] It is not the purpose of this communication to go into the merits of vagotomy, except to say that, in spite of adverse *a priori* considerations, the operation has a legitimate place in the surgical treatment of peptic ulcer, and Dragstedt deserves credit for reviving it. Vagotomy has no place in the treatment of gastric ulcer, but in many cases of duodenal ulcer with excessive night secretion of highly acid gastric juice the procedure may be employed with undoubted benefit. Whether such benefits will be lasting cannot be determined. Nor is vagotomy the operation of choice in all cases, even for duodenal ulcer. Subtotal gastrectomy is preferred except in special instances.

In the past three or four years, whenever vagotomy has been elected for the treatment of peptic ulcer, we have supplemented it with left phrenic nerve crush (phrenemphraxis). In the earlier cases, in keeping with current practice, gastrojejunostomy was added to the vagotomy. Later, in a few cases, we have performed the phrenovagal interruption omitting the gastroenterostomy. In these operations, the phrenic nerve is dissected out in the neck and crushed by one member of the team while the surgeon does the vagotomy; this prevents any increase in the duration of the operation. Obviously, when transthoracic supradiaphragmatic vagotomy is performed, the phrenic nerve may easily be crushed with a forceps as it courses along the pleuropericardium in the chest. Efforts to crush the nerve transabdominally through an opening in the diaphragm at the esophageal hiatus are awkward, wherefore this approach, therefore, is not recommended. Patients subjected to phrenovagal interruption as just described were all out of bed on the day after the operation. None of them vomited, none of them had distention, and they were all back at work within three to five weeks after the operation. Roentgenograms taken before and after the operation (Figs. 1 and 2) demonstrate the elevation of the diaphragm followed by the fundus of the stomach, permitting the latter to assume a vertical position favoring drainage. From both laboratory and clinical experience, I am impressed with the role of the "pinchcock" mechanism in postoperative gastric retention, and the effect of its relaxation resulting from phrenic paralysis in relieving the symptoms.

My associates and I have found phrenovagal interruption a boon to poor risk patients for whom subtotal gastrectomy would be hazardous, and especially in localities where facilities for major surgical procedures are not ideal and the patients generally are subrisks. Thus, in a recent surgical pilgrimage in East Pakistan, I found it wiser in several cases of duodenal ulcer to employ vagotomy, with adjunct phrenic crush, than to perform subtotal gastrectomy. I am convinced that gastrojejunostomy, in a very large percentage of cases, is freed of one of its chief handicaps, anastomotic ulcer, when vagotomy is added, and phrenic crush, by changing the position of the stomach, augments the total favorable effect.

Interruption of the left phrenic nerve has practically no contraindications when employed in conjunction with vagotomy. The crush, produced with a Kocher clamp, is followed by diaphragmatic paralysis that lasts only three to six months, which is quite long enough for the purpose. The ascension of the left hemidiaphragm is usually sufficient, even when it is obvious that the interruption is not complete, so that the question of anomalies and accessories is of little import here. The person who does the neck dissection must, of course, be thoroughly grounded in the anatomy of the region, and injuries to the thoracic duct, the vagus or sympathetic nerves in the neck and major vessels, such as have been reported in earlier articles, should never occur. Untoward sequelae that may follow phrenic exeresis of course will not happen after phrenic nerve crush. The criticism that reduction of the cough reflex and diminution of the mobility of the lung may in-

crease the incidence of postoperative atelectasis, although based on sound *a priori* reasoning, has not seemed to us to be of practical importance. This criticism has been raised in connection with transthoracic operations when it has been customary to crush the nerve on the pericardium to favor the rest of the hemithorax.

There remain many unsolved problems which are under continuing study in the Research Institute.

SUMMARY

1. A brief survey is made of the application of phrenic nerve interruption in clinical surgical practice.

2. A résumé is given of experimental work on the role of the phrenic nerve in vagotomy and in gastrointestinal mechanisms. The effects of phrenic interruption in shortening gastric emptying time, in favoring drainage of the stomach, and in relaxing the "pinchcock" action of the diaphragm are pointed out. Clinically an additional factor in reducing postvagotomy discomfort is the increased space within the abdominal cavity for the expansion provided by the elevated hemidiaphragm.

3. Reference is made to the benefits of phrenicotomy or other types of phrenic interruption in the treatment of intractable hiccoughs, cardiospasm, and (in certain cases) esophageal hiatus hernia. Because of the abundance of work on these subjects in the past, study of the effect of phrenic interruption on the chest or lungs and a discussion of its employment in tuberculosis have been omitted. The same is true of anatomic anomalies.

RESUMEN

Se hace breve resumen de la interrupción del nervio fréncio en clínica quirúrgica.

Se resume trabajo experimental sobre el papel del nervio frénico en la vagotomía y los mecanismos gastrointestinales. Se señalan los efectos de la interrupción frénica para acortar el tiempo del vaciamiento gástrico, favoreciendo la canalización gástrica y eliminando el pellizcamiento diafragmático. Clínicamente, al reducirse la molestia postvagotomía, constituye un factor adicional el espacio intraabdominal aumentado por la expansión debida al hemidiafragama elevado.

Se hace referencia a la utilidad de la frenicotomía u otros tipos de interrupción frénica en el tratamiento de hipo intratable, cardioespasmo y en ciertos casos de hierna del hiato esofágico. Se ha omitido el estudio del efecto de la interrupción diafragmática sobre tórax o pulmones y discusión de su smpleo en tuberculosis, debido al abundante trabajo sobre estos temas en el pasado. Puede decirse los mismo sobre anomalías anatómicas.

ZUSAMMENFASSUNG

1. Es wird ein kurzer Ueberblick ueber die Anwendung der Phrenikusunterbrechung in der klinischen Chirurgie gegeben.

2. Die experimentellen Arbeiten ueber ein klinischer Faktor bei, naemlich der Vagotomie und in der Magen-Darmmechanik werden zusammengefasst. Es wird darauf hingewiesen, dass die Unterbrechung des Zwerchfellnerven eine Verkuerzung der Entleerungszeit des Magens, eine Verbesserung des Abflusses vom Magen und eine Entspannung des Abklemmungseffekts des Zwerchfells zur Folge hat. Zur Verminderung der nach Vagotomie auftretenden Beschwerden traegt fernerhin ein klinischer Faktor bein, naemlich der durch die Erhoehung der Zwerchfellkuppe gewonnene und eine bessere Entfaltung des Magens gestatende Raum innerhalb der Bauchhoehle.

3. Es wird auf guenstige Resultate der Phrenikotomie oder anderer Formen der Phrenikusunterbrechung in der Behandlung des hartnaeckigen Schluckens, des Kardiospasmus und gewisser Faelle von Hiatushernien hingewiesen. Auf die Untersuchung des Einflusses der Phrenikusunterbrechung auf die Brusthoehle oder die Lungen und auf die Eroerterung

ihrer Anwendung bei Tuberkulose wird wegen des bereits ueberreichlich vorhandenen Studienmaterials auf diesem Gebiet verzichtet. Das Gleiche gilt fuer anatomische Anomalien.

RÉSUMÉ

1. Dans la chirurgie pratique, un bref examen pour l'application de l'arrêt du nerf phrénique.

2. On présente un résumé sur le rôle du nerf phrénique dans le mécanisme de la vagotomie et de la gastro-intestinale. On nous fait voir les avantages de l'arrêt du nerf phrénique en raccourcissant le temps où l'estomac demeure à jeûn, en favorisant le drainage de l'estomac et en délivrant la gêne diaphragmatique. Cliniquement, pour réduire les complications de la vagotomie, il est d'usage de laisser un plus grand espace entre la cavité abdominale, pour l'expansion de l'hémidiaphragme durant ce temps élevé.

3. Des renseignements nous sont fournis quant aux effets prodigieux de la néphrectomie dans le traitement des cardiospasmes, du hocquet, et (certains cas) de hernie du hiatus diaphragmatique. A cause du trop grand nombre de travaux sur ce sujet, il nous a fallu s'abstenir de parler ici de l'effet de la néphrectomie dans les cas pulmonaires, la tuberculose. Il en est de même des anomalies congénitales.

RIASSUNTO

1. Viene fatto un breve riassunto delle indicazioni della interruzione del nervo frenico nella practica chirurgica.

2. Viene presentata in riassunto una ricerca sperimentale sulla funzione del frenico nella vagotomia e nel meccanismo gastro-intestinale. Vengono sottolineati gli effetti della interruzione del frenico nell'accorciamento del tempo di vuotamento gastrico, nel favorire il drenaggio gastrico e nel rilasciare l'azione di sollevamento del diaframa. Clinicamente un fattore associato contro i disturbi da vagotomia è rappresentato dall' aumento dello spazio endo-addominale in rapporto all' innalzamento del diaframma.

3. Vengono riassunti i benefici della frenicotomia e delle altre operazioni di interruzione del frenico nella cura del singhiozzo ribelle, del cardiospasmo e di qualche caso di ernia dello hiatus. Si tralascia, invece, la trattazione degli effetti della interruzione frenica nel campo della chirurgia toracica e della tuberculosi polmonare a causa dell'enorme quantità di studi comparsi in passato su questi argomenti.

SUMARIO

1. E feita uma rapida revisão da aplicação da interrupção do nervo frenico na clinica cirurgica.

2. E dado um resumo de trabalho experimental sobre a função do nervo frenico na vagotomia e na mecanica gastro-intestinal. Os efeitos da interrupção do frenico na diminuição do tempo de esvaziamento gastrico, favorecendo a drenagem do estomago e abrindo a pinça do diafragma são postas em destague. Um fatôr clinico adicional em reduzir o disconfôrto post-vagotomia é o espaço aumentado dentro da cavidade abdominal, devido a expanção obtida pelo hemidiafragma elevado.

3. E feita referencia sobre os beneficios da frenicotomia ou outros tipos de interrupção do frenico no tratamento de soluço intratavel, cardiospasmo e, em certos casos, hernia do hiato esofagico. Devido a abundancia de trabalhos nestes assuntos no passado, foi omitido o estudo do efeito da interrupção do frenico sobre o torax ou pulmões, bem como a discussão de seu emprego na tuberculose. O mesmo foi feito em relação as anomalias anatomicas.

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Lumbar Sympathectomy for Peripheral Vascular Diseases of the Lower Extremity

Concepts of Physiology and Therapeutic Effects

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IN less than a decade, lumbar sympathectomy has become a proved and accepted procedure for many vascular disorders in the lower extremities. What is the modus operandi of lumbar sympathetic interruption? The answer is far from final, but the following physiologic considerations are relevant. In the normal lower extremity postural hypertension is present, since the peripheral resistance increases with the legs in the dependent position, either sitting or standing. Thus the vasoconstrictor tonus at such times accounts for increased diastolic tension. It is for this same reason that the feet become cold when one stands or sits. Emotional upsets frequently initiate vasoconstriction, as do exposure to lower environmental temperatures and other reflex mechanisms. The favorable results following interruption of sympathetic control are attributed by de Takats and Evoy[1] to the preceding mechanisms. Thus, after sympathectomy, postural hypertension and reflex thermal and emotional vasoconstriction are abolished. Although the denervated limb cools on exposure to cold, it recovers more rapidly in warm surroundings than does the normal extremity.

Another phase of interpretation of cutaneous temperature is exceedingly important. This concerns determinations of temperature gradients before and after testing, frequently employed as a guide for operation. Specifically, it is a fallacy, based on a disproved theory, that the blood normally enters the distal limits of the extremity at body temperature. This erroneous conception has been exposed by the work of Bagett and his associates,[2] who demonstrated that the blood entering the peripheral circulation is precooled, especially in the presence of vasospasm. The toes often approach or equal the environmental room temperature and may even drop below this level if sweating is marked (heat loss by evaporation). Another important basic concept has been emphasized by Goetz[3] concerning the rate of blood flow, which is dependent on the caliber of the vessel to the fourth power of its diameter; e.g., an artery narrowed from 4 to 2 mm. is reduced to one-sixteenth of its normal capacity.

Although professional knowledge of the physiologic aspects of vascular phenomena has been greatly increased in recent years, the not infrequent variable and paradoxic results of lumbar sympathectomy remain unexplained. A discussion might logically be outlined under two categories, namely, the clinical and the theoretical. Concerning the former, it is most appropriate to quote Sir James Paget, ". . . Receiving thankfully all that physiology or chemistry or another science can give us, let us still hold that that alone is true which is proved clinically, and that which is clinically proved needs no further evidence." Theoretical data as advanced by Grant[4] and by Friedlander and others[5] would appear to show that the leg muscles are not under sympathetic control. Contrary experimental evidence has been presented by Grimson and Shen.[6] From the clinical point of view, the former experi-

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ments would not be of paramount significance, since the many salutary effects of sympathectomy are indisputable. It is generally agreed, that denervation eliminates vasomotor tone and improves the circulation by facilitating the development of the collaterals. For example, the most common organic vascular disease is arteriosclerosis obliterans. The primary pathologic change is located in the large and medium-sized arteries, but the uninvolved collaterals are capable of dilatation (a fact so often forgotten!). Haxton[7] ably summarized the beneficial effects following sympathectomy by emphasizing the following physiologic facts: He stated that the improved blood flow was most apparent in the distal areas of the extremity, for three reasons: (1) Vasoconstrictor tone is normally most prominent in the skin of the digits, this skin being proportionately much greater in bulk than the remainder of the toes—a ratio not equalled by any other part of the extremity; (2) the large number of arteriovenous anastomoses in the toes allows for a more marked increase in blood supply; and (3) since, normally, the temperatures of the extremities decrease at the distal ends because vascular tonus is greater here, the salutary effect following sympathectomy is present where it is usually needed most.

Stein and his associates,[8] in their investigations on man, substantiated Haxton's views and added relevant data. They showed that after sympathetic ablation, in addition to the increased blood flow to the skin in the distal parts, the flow of blood to regions where muscle tissue predominates, such as the calf or the forearm, was practically unaffected. They injected epinephrine intra-arterially and observed dilatation of the arteries of the muscles. This experiment demonstrates that paralysis of the sympathetic nerves does not cause arterial dilatation of arteries in muscles. In addition, they concluded that vascular control in muscles was due to local change according to demand and not to stimulation of sympathetic nerves. They inferred that the muscle responds to exercise, direct heating, and ischemia by vasodilatation.

It is postulated by some that sympathectomy, in causing dilatation of the cutaneous vessels, tends to concentrate and increase the blood in this region at the expense of the muscles. Clinically, this is not true and may be disproved by the report of Barcroft and Endholm.[9] Using the plethysmograph method, they showed that, immediately after sympathectomy, the blood flow in muscles is increased twofold, although arterial tonus gradually reappears in about one week.

The enormous increase in blood flow to muscles during exercise is not readily accounted for by a decreased vascular tonus in the muscles. Certainly, as an emergency measure, sympathectomy may save a limb. Indications for this procedure may include acute injury to large arteries, acute arterial thrombosis or, in selected cases, arterial embolization with impending gangrene.

Another salutary result of denervation was shown by Eichna,[10] who determined the pressure within the capillaries before and after sympathectomy. The pressure on the arteriolar side was found to be greatly increased and was associated with a faster blood flow in the capillaries. Clark[11] has called attention to sympathetic paralysis, which is often encountered as a complication of a mixed nerve injury. The affected arteriovenous anastomoses remain dilated for about ten to fourteen days but return to normal caliber thereafter. On the other hand, sympathectomy results in a more or less lasting vasodilatation. Freeman and his collaborators[12] attributed this maintenance of increased cutaneous temperature to a more lasting effect on the arteriovenous shunts following ganglionectomy.

It is not my purpose to list the indications or contraindications for lumbar sympathectomy. A more complete or up-to-the-minute understanding of the principles involved, including the physiologic and pathologic character of the disease entities, should enable one to apply this operation to the individual case. It is quite

obvious that for vasospastic diseases in general, for early organic diseases with ample collateral circulation, and for organic disease with superimposed arteriospasm, the results of sympathectomy are uniformly good to excellent. As has been mentioned, empiricism also enters into the matter to some extent, and depending on the clinical experience of the surgeon.

Exactly what makes for controversy in the classification of indications? A proper preoperative evaluation is not always possible, for many reasons. A common source of error is the reliance placed on the apparent results following poor or inconclusive paravertebral blocks. Lack of response as evidenced by absence of elevation in cutaneous temperature does not preclude operative failure. Since, in performing vasodilatation tests, sufficient time may not be allowed for maximum effect to take place, great reliance has been laid upon the subjective improvement after such tests.

Further, it is frequently difficult to evaluate the collateral circulation. An ample collateral circulation will respond to sympathectomy regardless of the degree of organic occlusion of the larger arteries. This accounts for the "unexpected" good results observed when preoperative tests, because of their inadequacy, failed to show the presence of a sufficient collateral circulation.

Goetz[13] has offered a more accurate method of measurement, namely, digital plethysmographic study, in which a disproportion between the peak of pulse volume and the rate of arterial inflow indicates the presence or absence of an adequate collateral flow. Clinicians now recognize the fact that sympathectomy results in far greater vasodilatation than does ganglion block alone. Thus, the empiric use of sympathectomy according to clinical judgment is frequently successful in developing collateral circulation in numerous instances when lumbar ganglion block has proved ineffective.

Many complicated tests requiring special instruments and time-consuming work have been devised to aid in assessing the vascular status of the patient. Many of the simple and easily applied tests suffice for practical purposes in evaluating obvious conditions. When finer investigation becomes necessary, the aforementioned methods are valuable. A good example is the determination of electrical skin resistance. When this value is high after a lumbar block or sympathectomy, it indicates satisfactory sympathetic ablation. This test has been modified by Haxton.[7] The principle involved is that moist skin has excellent conductivity—dry skin, the contrary. Thus, if the sympathetics are paralyzed, the electrical conductivity is lowered (high skin resistance). In general, the clinical signs indicative of vasospasm are sweating, cyanosis, delayed pallor on elevation and constriction of veins on the dorsum of the foot. On the other hand, suggestive of advanced disease and a poor collateral bed with low tonus is atrophy of the skin and subcutaneous tissues, with rapid blanching on elevation. It is quite obvious that these clinical signs are only suggestive.

Intermittent claudication indicates ischemia of muscle on exercise. This was first accurately described and analyzed in 1831 by the veterinary surgeon Boullay.[14] Since that time there has been no agreement on an explanation of the actual pain factor. A recent review on this subject by Ratcliffe favors the theory of metabolite accumulation in ischemic muscles as the causative element. Lewis[15] showed experimentally that, during induced ischemia, the pain is caused by an accumulation of metabolites acting on sensory nerves. Thus there occurs a cycle in which muscle activity produces metabolites; these are incompletely removed by a poor blood flow, which, however, is efficient enough when the muscles are at rest. Among other hypotheses on the pain mechanism are the muscle spasm theory, the arterial spasm theory and the theory of muscular ischemia. The fact that during claudication the muscle may actually be flaccid argues against the muscle spasm theory. Since vasodilatation is the physiologic reaction during exercise, the theory

of spasm is refuted. Intermittent claudication, to be treated successfully, requires therapeutic measures directed toward decreasing or eliminating ischemia in the muscles. Lumbar sympathectomy often succeeds. If intermittent claudication is only partially relieved, one must not be too hasty in condemning sympathectomy, particularly if the operation shows other evidence of improved circulation. The patient must have been made cognizant of the fact that the primary purpose of the operation was to save his leg from progressive arterial damage.

A knowledge of the anatomic variations of the lumbar sympathetic nerves is essential to the surgeon. Since anomalies are common in this region, it is easy to understand why incomplete denervations are frequent in the hands of the surgeon who operates only occasionally. Poor end results are often wrongly attributed to the procedure itself. Frequently the pathologist's report will read "specimen is lymphatic chain," or, "somatic nerve" (genitocrural). Briefly, the anatomic variations[16] are as follows:

1. Overlapping of the distribution of sympathetic nerves; i.e., the rami communicans splits to enter two or more somatic nerves.
2. "Misplaced" sympathetic ganglia through which the rami are able to bypass the lumbar ganglion chain and pass directly to the lumbar nerves. These aberrant ganglia may be variously located—in the grey rami, in the anterior rami of lumbar nerves, or adjacent to a lumbar nerve root.
3. Independent connecting fibers between adjacent lumbar nerves, occasionally between the first and second, or between the second and third, lumbar levels.
4. Crossed fibers between the right and left sympathetic trunks.
5. Lumbar ganglia vary in number and position—often fused.
6. Divided sympathetic chain—double; triple.

For permanent effects from surgical intervention, the operation must be thorough. Intact fibers missed during operation are capable of stimulating neighboring denervated smooth muscles.

The subject of "paradoxic gangrene" has received some emphasis in the recent literature. Gangrene following lumbar sympathectomy has occurred in cases of advanced occlusive disease. Popoff[17] attributed this result to the opening up of arteriovenous shunts by loss of vasomotor control whereby the blood is short-circuited from arterioles to veins, thus depriving the capillary bed of its nourishment. Another theoretical objection to sympathectomy has been offered by some who maintain that vasodilatation takes place in the skin only, so that, in effect, the muscles are deprived of blood. Another explanation is that loss of tone decreases the peripheral resistance, thereby lowering the pressure to such a degree that it cannot give enough *vis a tergo* to the capillaries. A close analysis of most of these cases of so-called paradoxic gangrene suggests that the relation of this catastrophe to the operation is not real. At least, when gangrene appeared late or was already "on the way," the diagnosis of postoperative gangrene is doubtful. If this occurrence were as genuine as some consider it, many more cases would be reported, especially since many sympathectomies are performed in the presence of all odds without ensuing gangrene. To argue that the skin receives most of the blood at the expense of the muscles postoperatively is not favorable to the paradoxic gangrene theory, since in most cases of gangrene resulting in amputation the condition originated in the skin and not in the muscles. Moreover, with an increased cutaneous supply, a later improvement to muscle blood supply is likely. Some observers have expressed the opinion that a fall in cutaneous temperature following paravertebral block presages gangrene following the operation, particularly in cases of advanced disease. They reason that low tonus plus arterial obstruction allows the arteriovenous fistulas to shunt most of the little available blood directly to the veins instead of the skin.

Another unfavorable effect following

operation is thought to be due to an increased metabolic rate brought about by abolishing the metabolism-inhibiting sympathetic impulses. Thus there is an increase in blood volume secondary to increased metabolic oxygen requirements.

Freeman and his associates[12] compared the unfavorable results in cases of large arteriovenous aneurysm in which the main proximal artery is ligated with those of sympathectomy performed for advanced arteriosclerosis, in which obliteration of the large artery allows whatever collaterals are available to empty into the venous return in the presence of a lower peripheral resistance.

Also to be included in the etiologic background of gangrene is acute arterial thrombosis, with sudden lowering of blood pressure during and after the operation. It is a fact that general as well as spinal anesthesia paralyzes the sympathetics, as is evidenced by a rise in skin temperature and dryness of the skin. But it is also noticed on occasion, as was pointed out by Felder and his co-workers,[18] that the limbs of a patient under deep ether narcosis may be sweaty and cold. This paradoxic phenomenon has been observed during ether anesthesia in previously sympathectomized limbs when the contralateral sympathectomy was performed. Felder and his associates postulated that possibly ether anesthesia causes local tissue asphyxia, which in turn causes an increased discharge of epinephrine, thereby causing peripheral vasoconstriction. Arteries previously denervated are more susceptible to humoral influences than are normal arteries. It is possible that the coldness and sweating are part of the temporary postsympathectomy phenomenon to be described later.

After sympathectomy, a definite train of events takes place. A postoperative period of three weeks should elapse before the results of the operation are judged. For a few days the temperature of the skin is increased. Sweating is absent. Not infrequently, however, from the third to the sixth day, there occurs an unaccountable drop in temperature accompanied with sweating and coldness of the limb; but these disturbing signs last only one or two days. It is also known that sensitivity to epinephrine is increased by the end of the first week, reaches its maximum in two weeks and tapers off in three weeks. When this leveling-off point is reached, the circulatory status may be better evaluated. It is suggested that these phenomena are due to persistent stimulation from decentralized ganglia or to slight residual innervation.[19]

In conclusion, the need for proper evaluation of the individual case should be emphasized. The surgeon's concepts of the mechanisms involved in the physiopathologic as well as the normal physiologic aspects must be as nearly complete as available knowledge permits. The excellent results in my own experience permit me to praise sympathectomy as a therapeutic procedure for vascular diseases of the lower extremity.

SUMMARY

Lumbar sympathectomy is a valuable and accepted treatment for vascular diseases of the lower extremities. The proper application of this procedure requires a thorough understanding of basic principles, including those of pathology, physiology and applied anatomy. Arteriosclerosis obliterans may be used as an example. In this disease the large and medium-sized arteries are organically involved, while the smaller arteries and collateral circulation remain undisturbed in the early stages. These vessels are subject to various influences that alter their caliber.

The control of physiologic tonus plays an important part in the progress of the disease. Eventually the integrity of the limb may depend solely on the competency of its collaterals; thus the role of sympathetic denervation becomes obvious. An adequate sympathectomy is possible, however, only when the surgeon is aware of the anatomic anomalies that are common in the lumbar region. Although empiricism plays a part, basic concepts are in-

dispensable to the performance of lumbar sympathectomy.

SUMARIO

A simpatectomia lombar é um tratamento valioso e aceito para o tratamento das doenças vasculares das extremidades inferiores. A aplicação propria deste processo requer um completo entendimento de principios basicos, incluindo aqueles de patologia, fisiologia e anatomia aplicada. A arteriosclerose obliterante pode ser usada como um exemplo. Nesta doença as arterias de grande e medio calibre são organicamente envolvidas, emquanto que arterias menores e a circulação collateral permanenecem inalteradas no principio. Esses vasos são sugeitos a varias influencias que alteram seu calibre. O contrôle do tonus fisiologico desempenha um papel importante no progresso da doença. A integridade do membro pode eventualmente depender so da competencia da circulação colateral; assum a função da denervação simpatica se torna obvia. Uma simpatectomia adequada é possivel, contudo, somente quando o cirurgião esta abertado sobre as anomalias anatomicas que são comuns na região lombar. Os conceitos basicos são necessarios, embora o empirismo desempenhe bõa parte no processo da execução da simpatectomia lombar.

ZUSAMMENFASSUNG

Die lumbale Sympathektomy stellt eine wertvolle und anerkannte Methode in der Behandlung von Gefaesserkrankungen der unteren Extremitaeten dar. Die richtige Anwendung des Verfahrens setzt eine eingehende Kenntnis der Grundsaetze, auf denen es beruht, voraus; dazu gehoeren die pathologischen, physiologischen und anatomischen Zusammenhaenge. Die obliterierende Arterioslerose mag als Beispiel dienen. Hier sind die grossen und mittelgrossen Schlagadern organisch erkrankt, waehrend die kleineren Gefaesse und der Kollateralkreislauf in den fruehen Stadien nicht beteiligt sind. Diese Gefaesse unterliegen verschiedenen Einfluessen, die ihr Kaliber veraendern. Die Regulierung des physiologischen Tonus spielt in der Entwicklung der Krankheit eine wichtige Rolle; die Erhaltung des Gliedes kann schliesslich nur noch von der Funktionstuechtigkeit der Kollateralen abhaengen, und die Bedeutung einer sympathischen Denervierung wird offensichtlich. Eine wirksame Sympathektomie kann aber nur von einem Chirurgen ausgefuehrt werden, der mit den zahlreichen anatomischen Anomalien der Lendengegend vertraut ist. Wenn auch die Empirie eine gewisse Rolle spielt, so kann doch zur Ausfuehrung der lumbalen Sympathektomie auf die Kenntnis der grundlegenden Zusammenhaenge nicht verzichtet werden.

RÉSUMÉ

La sympathectomie lombaire est le traitement décrété pour les maladies vasculaires des membres inférieurs. Ce procédé cependant demande une vraie connaissance de la pathologie, physiologie et anatomie appliquée. L'artériosclérose nous en présente un des meilleurs examples. Dans cette maladie, les grandes et les moyennes artères sont directement intéressées, alors que les artérioles ainsi que la circulation collatérale demeurent indépendantes. Ces différents vaisseaux sont sujet à des influences variées qui altèrent leur calibre.

La marche de la maladie dépend du contrôle physiologique qu'on apporte. Eventuellement, l'état sain du membre peut dépendre uniquement du bon état de ses collatérales; alors la sympathectomie devient nécessaire. Cependant, la sympathectomie est possible seulement quand le chirurgien s'y connaît bien en anomalies anatomiques communes dans la région lombaire. Les principes de base, l'expérience sont aussi indispensables dans la chirurgie sympathique.

RESUMEN

La simpaticectomía lumbar es un tratamiento aceptado y de valor para las enfermedades vasculares de los miembros

inferiores. La adecuada aplicación de este procedimiento requiere un conocimiento completo de principios básicos, incluyendo los de patología, fisiología y anatomía aplicada. Puede citarse como ejemplo la arterioesclerosis obliterante. En esta enfermedad se encuentran orgánicamente interesadas las arterias de grande y mediano calibre, mientras las arterias más pequeñas y la circulación colateral se encuentran sin trastorno en las fases tempranas. Estos vasos se encuentran sometidos a diversas influencias que alteran su calibre.

El control del tono fisiológico juega parte importante en el progreso de la enfermedad. Eventualmente, la integridad del miembro puede depender solamente de la capacidad de sus colaterales, mostrándose evidente entonces el papel de la desnervación simpática. Sin embargo, una adecuada simpaticectomía es sólo posible cuando el cirujano es conocedor de las anomalías anatómicas comunes a la región lumbar. Aun cuando el empirismo toma parte, los conceptos básicos son indispensables para efectuar la simpaticectomía lumbar.

RIASSUNTO

La simpatectomia lombare rappresenta un metodo di cura efficac-e e riconosciuto nelle malattie vascolari degli arti inferiori. L'applicazione corretta di tale metodo richiede una conoscenza completa dei principi generali di patologia, fisiologia e anatomia applicata. Si può prendere come esempio l'arteriosclerosi obliterante; in questa malattia sono interessate le grandi e le medie arterie, mentre le piccole e il circolo collatrale rimangono normali negli stadi precoci. Tali vasi sono sottoposti all'influenza di fattori vari che ne alterano il calibro.

Il controllo del tono fisiologico ha una parte importante nel decorso della malattia. A volte l'integrità dell'arto dipende soltanto dall'integrità delle collaterali, quindi diventa chiara la importanza della denervazione simpatica. Una sipaticectomia corretta, tuttavia, è possibile solo quando il chirurgo sia al corrente delle anomalie anatomiche che sono cosi comuni nella regione lombare. Benchè l'esperienza empirica abbia la sua parte, pure sono indispensabili alcui concetti basilari per eseguire la simpaticectomia lombare.

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Hyperextension Back Brace for Orthopedic, Geriatric and Adolescent Osseous Conditions

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THE development of the hyperextension back brace here recommended has been described in previous papers by one of us (E. L. J.) and has been presented at two meetings of the International College of Surgeons and one meeting of the American Fracture Association (formerly the Ambulatory Fracture Association). Ample time has elapsed and a more than adequate series of patients followed for many years to warrant a cautious increasing optimism as to its use for certain conditions of the vertebral column. The brace does no more than a well-applied, well-fitting hyperextension plaster of paris cast can do, but it does it more simply, more easily and more economically and with much greater comfort to the patient.

The brace weighs only about 2½ pounds (1.1 Kg.), can be worn beneath the ordinary clothes without much, if any, alteration of them, and is completely waterproof and perspiration-proof. The metal parts are made of an aluminum alloy and stainless steel, and the sternal, pubic and lumbar pads are well padded with foam rubber and covered with plastic. Nylon thread is used to sew all seams of the plastic, and no leather is used at any point. The patient is allowed to take either tub baths or shower baths and can even go swimming with the brace on. Furthermore, cotton undershirts can be fairly easily changed at any desired time and should be worn beneath the brace, as certain persons have a cutaneous reaction to the plastic covering. In rare instances two or even three layers of cotton underclothing should be worn between the body and the plastic-covered pads that come into direct contact with the skin.

Before the brace was used exclusively for uncomplicated fractures of the lower half of the thoracic and lumbar portions of the spine, its worth had to be proved. This has been done over and over again, so that we know the brace will maintain just as much hyperextension as the body will withstand in regard to pressure of the various pads on the opposing body surfaces and parts. Many backs have been kept in better hyperextension by these braces than was possible with the best-applied plaster of paris hyperextension jackets previously used. The exact amount of hyperextension desired and tolerated by the patient takes some judgment and skill on the part of the physician and the brace fitter, but careful watching for signs of pressure on the sternum, the symphysis pubis and the lumbar region, together with constant checking by roentgenogram, can prevent any serious complications. The use of plaster of paris, the operating room, anesthesia, Goldthwait's bars, Davis slings and other similar hyperextension devices are eliminated.

Many of our patients who have to be in hyperextension and ambulatory, because of their age, general condition and fear of large heavy casts do not tolerate hyperextension plaster jackets. Some of them even balk at wearing one of these braces, but when told in detail about its advantages over a plaster cast they usually acquiesce without too much argument.

For several years after the initial use of this brace it was made from a plaster cast and took about one to two weeks to assemble. When the patient was taken to the operating room for application of the hyperextension cast, two casts were put

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on, one after the other. The first was cut off immediately and allowed to harden and then used as a model for the manufacture of the brace. The other cast was worn by the patient until the brace could be substituted for it. In the past six years the brace has been made exclusively from measurements of the patient, generally with the patient recumbent, either on a board mattress or in more or less hyperextension.

As has been brought out in the two former papers on this subject, great care must be taken to eliminate patients with injury to the cord, nerve root, pedicle or facet when using this brace and employing early ambulation. It is only with uncomplicated compression fractures of the lower thoracic and lumbar portions of the spine that the patient can be put into hyperextension as quickly as possible and made ambulatory with the brace on as soon as adequate hyperextension, with reduction of the compression fracture or fractures, has been obtained.

This hyperextension is accomplished by putting the patient to bed with the Gatch part under the lower lumbar part of the spine. Generally jointed boards are placed over the whole bed under the mattress, so that as the Gatch part is raised the patient's back goes into hyperextension, with no sagging in the middle of the mattress. This reduction is made gradually over the few days it takes to get the brace made, and generally the pain is controlled with adequate medication. The patient may turn on either side of his body or lie on his back but, of course, should not lie prone. As was proved conclusively many years ago, hyperextension of the back, with reduction of the compression fracture or fractures, takes place just as rapidly with the patient lying on his side as when he is recumbent. However, we try to have the patient lie on his back as long as possible and encourage lying on the side only for his comfort and mental ease. Pillows may be placed under the head and under the knees, but the buttocks and the shoulders must not be elevated from the mattress. If the patient tends to migrate to the foot or the head of the bed, shock blocks and extra pillows at either end of the bed can eliminate the habit. About twice as much hyperextension is possible with the ordinary fully elevated Gatch as can be obtained with the usual Bradford frame. If more hyperextension is wanted, it can be easily obtained by tying sandbags or something of the sort at the apex of the Gatch. Fairly often adequate reduction of the fractured spine with wedging is obtained within a day or two, and the brace can be put on as soon as checking by portable roentgen films indicates that it has been accomplished. When there is no compression but fractures can be seen or suspected ("pre-Kümmell condition") the brace can be applied the same day without the patient's being in hyperextension at all. We simply put the patient on a hard bed, obtain his measurements, have the brace made within a few hours and then put it on with the back in moderate hyperextension. This, of course, will prevent the development of kyphosis with compression of the involved vertebral bodies.

It is strange that many physicians do not clearly understand the principle of the hyperextension process, with one force in the posterior part of the spine and two directly opposite forces on opposite ends of the anterior bony framework of the back, chest and pelvis. This is the principle of the hyperextension frames and of the bed whose apex exerts pressure upward and gravity exerts pressure downward through the weight of the body, acting on the ends of the two levers extending cephalad and caudad from the force under the lumbar part of the spine. A hyperextension plaster cast and this brace merely maintain the same opposing system of forces that existed with the patient lying recumbent in hyperextension. A brace of the Taylor type cannot and does not maintain any such degree of hyperextension. The two principles are entirely different, and, although the Taylor brace can and does give definite support to help keep the back straight, it cannot maintain any marked degree of real hy-

perextension, such as is necessary in the case of compression fractures of the spine and the other conditions for which this brace is used.

For uncomplicated compression fracture of the spine, as aforedescribed, the post-reduction convalescent regime is the same as that employed in the case of a patient with a plaster hyperextension cast. The only difference is that a patient wearing one of these braces is ordinarily allowed to go back to light work shortly after he is out of the hospital and often can do rather heavy work within two or three months after the trauma, which would be impossible with a large, heavy, cumbersome plaster of paris cast. Also, after several months, when the fracture is fairly well healed but some immobilization in hyperextension is still desirable, the patient may be allowed to take off the brace at night and sleep on a hard bed and then put the brace back on himself, or have a member of the family do it, in the morning. This is a great comfort, especially to elderly or fleshy people. This insures against reinjuring the back during the working and waking hours and eliminates replacing the plaster cast with a Taylor brace, which is done in most instances.

Hyperextension exercises for the muscles of the back, as advocated by Bohler and others, are easily carried out, and heat and massage can be applied early to the back muscles, which is not possible in the case of a plaster cast.

We have over 350 patients who have been treated by this non—plaster cast method, and the results, in our opinion, are better than any we could have obtained by the old ordinary methods that employ the plaster of paris hyperextension body cast.

An elderly person with osteoporosis of the spine may have a great deal of pain without any definite collapse or wedging of any of the vertebral bodies. Such a patient, we are convinced, is in the prewedging state as observed in cases of Kümmell's traumatic spondylitis, and will collapse if allowed to be ambulatory for a long period. He should be put to bed on a hard mattress with a board under it, or in some hyperextension if there is a considerable amount of pain and any recent wedging with kyphosis. The patient is measured for the brace, which is made and applied as for a fracture of the back as aforedescribed. Ambulation is allowed as soon as maximum reduction is obtained and the patient is free of pain. A patient with minimal pain and no compression or old fixed compressions can sometimes be kept in bed without any hyperextension but allowed up and about with the brace on, without needing any bed rest in prolonged hyperextension. Each case is an individual problem as regards early ambulation and the elimination of pain. Some patients are allowed to take the brace off at night and sleep on a hard bed, but most of them prefer to keep the brace on day and night and after a few nights do not seem to mind sleeping in it. For these osteoporotic patients the brace simply acts as a support until the medical regime can be carried out so that the strength of the spine can be made adequate. The following medical routine is most important:

Just as soon as one of these patients is put into our hands, we do a complete medical work-up and begin the anti-osteoporotic therapy. We establish a combined estrogen and androgen hormonal regime, administering these hormones either hypodermically or orally, according to the practice of Aldrich. If the women patients begin to have mammary or vaginal complications, such as tingling, itching or bleeding, we either decrease the estrogen or increase the androgen, and usually we can continue the medication without having to stop it altogether. At the same time we institute a high vitamin, high protein diet, with calcium and phosphorus in adequate amounts between meals and at bedtime. We try to include 3 to 4 Gm. of bone phosphate or a dicalcium phosphate preparation, which is much better assimilated on an empty stomach. Generally these patients have more or less achlorhydria, and we administer hydrochloric acid with meals. This is an important factor in the absorption and assimilation of calcium and

phosphorus. At the same time we give the patient 50,000 units of Vitamin A, with at least 1,000 units of Vitamin D, daily. Concomitantly, we employ an adequate Vitamin B regime which includes all of the B factors, and also give them at least 750 mg. of Vitamin C a day to promote healing. Because of the rapid excretion of ascorbic acid, we usually give 250 mg. every eight hours by mouth. A low metabolic rate, of course, demands adequate thyroid medication, and an increased cholesterol content in the blood is helped by adequate administration of choline and inositol (generally 500 mg. of each a day) and a fat-free diet.

A search should always be made for any increase of uric acid in the blood stream, as some of these patients have gouty tendencies. At the same time, we are always on the alert for herpes zoster in its precutaneous eruptive stage. Also any other condition in the gastrointestinal tract or the cardiovascular system, or any intrathoracic pathologic change, must be kept in mind, as the pain associated with all of these conditions simulates pain from osteoporosis of the spine with or without compression of one or more of the vertebral bodies. Of course, tumor, cyst, infection, osteomyelitis or ruptured disc of the thoracic portion of the spine, as well as other conditions, must be considered in the differential diagnosis.

The medical routine and the wearing of the brace for osteoporotic conditions of the spine are kept up until the patient is symptom-free, and then the brace can be discarded as thought best. The medical routine, however, should be continued for several months or as long as necessary, in some cases several years.

We have 78 of these patients whom we have followed for an average of four years, and the results have been most successful. A plaster cast on many of these patients would be an unbearable burden.

Another important use for this brace is in cases of the Strümpell-Marie (rhizomelic spondylosis) type of spinal arthritis. One of our first patients with this condition reported to the office several years ago, having had seventeen plaster casts on his back during a four-year tour of duty in the army. The arthritis began soon after he entered the service, and he spent most of the four years in various hospitals and dispensaries and off duty. The first hyperextension brace we put on him gave him amazing relief from pain, and, as he was of very slight build, the lightness of it was of major importance. The medical treatment for arthritis is, of course, outside the province of this article and will not be discussed here. The brace is worn generally during the daytime and kept on as long as it gives the patient support and helps to curtail his pain. Patients with this condition sleep better on hard beds.

We have had 19 patients with Strümpell-Marie arthritis of the spine for whom we have employed this brace; they have all invariably perferred the brace to the plaster cast, and adequate hyperextension has been obtained.

When the brace is used for Scheuermann's disease (vertebral epiphysitis juvenilis, adolescent epiphysitis of the spine) the brace is put on and is worn only during the waking hours, but again the patient must sleep on a firm bed. In addition to the brace, various exercises are employed and an adequate dietary regime is maintained throughout. In many instances the brace is left on such a patient for several months; in other cases it must be left on several years, until the epiphysitis has ceased to progress or the epiphyses have fused with the main parts of the vertebral bodies. Children with this condition are allowed to take the brace off for social events and at some other times, e.g., for swimming or for sleep. A hard bed should be used. During most of the waking hours, however, especially when they are in the schoolroom or playing, the brace should be kept on, with as much hyperextension as the patient can stand or as is needed to keep the back adequately supported. The brace must be altered to keep pace with the growth of the body. This is easily done by the various possible adjustments. Check-up roentgenograms are taken every three to six months, and if any dietary or vitamin deficiency is present it is cor-

rected. Most of these young patients are nder the care of pediatricians or family octors, who work very closely with us.

We have 23 young patients with Scheu-rmann's disease using this type of brace, he average duration of use being fifteen nonths after the patient was first seen. Here again this brace is greatly superior o any type of immobilization of the back nd is ordinarily tolerated very well by ur young patients.

SUMMARY

The uses of the hyperextension back brace here described are enumerated, and its advantages over the Taylor type of brace or the plaster of paris hyperextension body cast are explained. The four conditions for which it is especially adapted are (1) uncomplicated vertebral fractures with compression (wedging) of the lower half of the thoracic portion and the entire lumbar portion of the spine; (2) osteoporosis of the spine, with or without wedging and kyphosis; (3) Strümpell-Marie spinal arthritis, and (4) Scheuermann's disease (vertebral epiphysitis juvenilis).

This brace is simply a means of maintaining the spinal column in the desired hyperextension while the underlying condition in each of the aforementioned categories is allowed to heal with or without medical or dietary help. In the authors' opinion, this brace is much better for this immobilizing purpose than any other available apparatus.

RÉSUMÉ

L'auteur énumère les usages de l'appareil d'extension dorsale et son avantage sur l'appareil Taylor. Quatre conditions surtout postulent son emploi. A savoir: une fracture simple de la colonne avec compression de la partie inférieure du thorax et de toute la colonne lombaire; l'ostéoporose de la colonne; avec ou sans enfoncement et avec xyphose; l'arthrite vertébrale Strumpell-Marie; la maladie de Scheurermann. L'auteur explique enfin la façon d'agir de l'appareil.

SUMARIO

Os usos da tala de hiperextensão dorsal aqui descritas são enumerados e suas vantagens sobre o tipo Taylor de tala ou sobre a minerva de hiperextensão são explicadas. As quatro condições para as quais ela é especialmente adaptada são (1) fraturas vertebrais não complicadas com compressão (cunha) da metade inferior da proção toracica e de toda a porção lombar da espinha; (2) osteoporose da espinha, com ou sem formação de cunha ou ciphose; (3) artrite espinhal de Marie-Strümpell; a (4) doença de Scheurermann (epifisite vertebral juvenil).

Esta tala é simplesmente um meio de manter a coluna espinhal na desejada hiperextensão enquanto a condição subjacente em cada das categorias preliminarmente mencionadas tem a oportunidade de cura com ou sem auxilio medico ou dietetico. Na opinião do autor esta tala é muito melhor para esta finalidade de imobilização do que qualquer outro aparelho conhecido.

ZUSAMMENFASSUNG

Die Anwendungsmoeglichkeiten einer hier beschriebenen Ueberstreckungsruekkenschiene werden aufgezaehlt, und ihre Vorzuege gegenueber der Schiene vom Taylor-Typus und gegenueber der Hyperextension mittels des Koerpergipsverbandes werden auseinandergesetzt. Die vier Erkrankungen, fuer die sie besonders geeignet ist, sind: 1—unkomplizierte Wirbelbrueche der unteren Brustwirbelsaeule u n d d e r gesamten Lendenwirbelsaeule mit Kompression (Keilform), 2—Osteoporose der Wirbelsaeule mit oder ohne Keilbildung und Kyphose, 3—Struempell-Mariesche Arthritis der Wirbelsaeule, 4—Scheuermannsche Krankheit (Epiphysitis juvenilis vertebralis). Die Schiene stellt ein einfaches Mittel dar, die Wirbelsaeule in gewuenschter Ueberstreckung zu halten, bis die zugrundeliegende Erkrankung der oben beschriebenen Art Gelegenheit hat, mit oder ohne medizinische oder diaetetische Unterstuetzung auszuheilen.

Der Verfasser ist der Meinung, dass diese Schiene sich zum Zwecke einer solchen Ruhigstellung viel besser eignet als alle anderen zur Verfuegung stehenden Apparate.

RIASSUNTO

Vengono elencati gli usi di un busto da iperestensione all'indietro, ed i suoi vantaggi sul busto tipo Taylor e sull'apparecchio gessato da iperestensione. Esso è particolarmente adatto in quattro condizioni: 1) fratture vertebrali non complicate con compressione (cuneo) della metà inferiore della porzione toracica e dell'intero tratto lombare della colonna; 2) osteoporosi del rachide con o senza angolo e cifosi; 3) artrite spinale di Strumpell Marie; 4) malattia di Scheurermann (epifisite vertebrale giovanile).

Il busto è un mezzo semplice per mantenere la colonna vertebrale nella iperestensione desiderata mentre la malattia, in ciascuno dei casi considerati, procede verso la guarigione con o senza l'aiuto medico o dietetico. Secondo l'Autore questo metodo consente di ottenere la immobilizzazione meglio di qualsiasi altro apparecchio disponibile.

RESUMEN

Se describe y se enumeran los usos de un aparato de hiperextensión. Se explican sus ventajas sobre el de tipo Tayor y el aparato de yeso. Se recomienda en: (1) fracturas vertebrales no complicadas con compresión de la mitad toráxica inferior y la porción lumbar total de la columna vertebral; (2) osteoporosis de la columna vertebral, con o sin compresión y cifosis; (3) artritis espinal de Strumpell-Marie; y (4) enfermedad de Scheurermann (epifisitis vertebral juvenil).

AVISO A TODOS OS MEMBROS DO COLEGIO INTERNACIONAL DE CIRURGIOES

A Casa dos Delegados, em 19 de maio de 1952, em Madrid (Espanha), escolheu a cidade de Sao Paulo (Brasil) para séde do futuro IX Congresso Internacional do Colegio Internacional de Cirurgioes, aprovando proposta de S. Exia. o Snr. Governador do Estado, Prof. Dr. Lucas Nogueira Garcez, e designou como Comissao organizadora daquele Congresso os membros brasileiros do "Board of Trustees," sob a presidencia do Prof. Dr. Carlos Gama, que é o primeiro Vice-Presidente Internacional, e Secretário Geral para a América do Sul.

O IX Congresso do Colegio Internacional de Cirurgioes terá lugar em Sao Paulo (Brasil), de 26 de abril a 2 de maio de 1954.

Os temas oficiais escolhidos sao os seguintes: 1) Experiancia com a Socializacao da Medicina em vários países.

2) Novas aquisicoes da Radiologia com contrastes, em todas as especialidades cirurgicas.

3) Experiancia com o emprego de antibióticos em todos os ramos da cirurgia.

A Comissao organizadora do Congresso procura desde já todos os elementos para que o IX Congresso do C.I.C. seja um dos mais notáveis do Colégio Internacional de Cirurgioes, ao mesmo tempo que uma das mais brilhantes comemoracoes do IV Centenário de Sao Paulo.

Afim de ter com bastante antecedencia dados seguros sobre o numero dos congressistas, e poder satisfatoriamente alojá-los, e programar de maneira absolutamente funcional as sessos, pede a todos os interessados, queiram comunicar imediatemente à Secretaria, no endereco abaixo.

—Prof. Dr. Carlos Gama, Sao Paulo,
Secretaria, Praca Ramos de Azevedo, 209, 7.° Andar, Sala 710, Sao Paulo, Brasil.

Rehabilitation of the Arm Amputee

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THE success of any program of rehabilitation of the arm amputee will depend chiefly on the extent to which those who plan the course of treatment consider the patient as an individual human being. It is possible to consider the leg amputee in terms of standard surgical procedures, prostheses and training technics, but this is not the case when a patient has lost one or both upper extremities. In the leg amputee's case we fit the prosthesis to the patient's stump; for the arm amputee, we fit it to his entire personality. Not only the site of the amputation and the type of prosthesis, but the patient's entire complex of traits, interests and requirements, influences the nature of his adjustment to his disability.

An integrated program of rehabilitation of the amputee has been summarized to include psychological preparation, adequate surgical treatment, after-care of the stump, provision of a prosthesis and training in the use of the prosthesis. In the case of the arm amputee, special emphasis is placed on psychological preparation and selection of the prosthesis that will best meet the patient's individual requirements. Psychological preparation is essential for all amputees, to overcome the emotion experienced at loss of a body part and to reassure the amputee about his ability to resume his place in the family and community environment. The leg amputee is usually oriented to his disability fairly easily through demonstrations, by other leg amputees, of how well the prosthesis can replace the relatively simple weight-bearing function of the leg. But no prosthesis, however ingeniously devised, can replace the complex structure and function of the arm and hand; it can only substitute for it, and poorly at best. Therefore, the arm amputee must be made aware of the limitations as well as the advantages of any artificial arm he selects. It is better for him to face the facts realistically early in the rehabilitation program than to be permitted to expect miracles and suffer disillusionment later.

Sites of election for amputations of the arm are well standardized: above the wrist, below the elbow and above the elbow amputations all provide good stumps. The amputating surgeon should remember that his responsibility, second only to arrest of the pathologic process, is provision of a stump that will enable the amputee to use a prosthesis with comfort and efficiency.

What type of prosthesis should be selected? Althugh leg prostheses are standardized for the various stumps, arm prostheses are available in seemingly infinite variety. It is important that the physician have an array of devices from which to choose, since the selection must be made on the basis of the patient's age, vocation, sex, social status and personal requirements. Since the hand is an extension of the brain, fashioned to execute the thousand tasks that the mind conceives, its function is not standard but as variable as people themselves. We cannot, for example, provide for the elderly woman the same type of prosthesis we give to the young male factory worker; their requirements are obviously different. The secretary requires a more functional prosthesis than the teacher. The amputee must decide, with the help of his physician, whether he requires a dress prosthesis, a functional prosthesis, or one that combines dress and function to the extent that this is possible.

There also exists the possibility of rehabilitating the patient without a prosthesis. Single, and sometimes double, arm amputees who have most of their fore-

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arms often prefer to do without an appliance. They approximate their long stumps and so obtain grasping power. Sometimes a leather band is tied around the lower end of the stump, and a tool can be inserted between the band and the stump. The tool, such as a pencil or an eating utensil, is held in place while it is being used. This method may prove satisfactory to some people, but most prefer to have some type of prosthesis if only for its cosmetic value.

The more usual types of arm prostheses are the single hook, the split utility hook, the mechanical hand and the dress hand. Various special prostheses and procedures are available for unusual or complicated conditions.

The function of the hook can be best understood by interpreting the hand in terms of its mechanical analogues. Basically, the hand operates as a forceps, a pair of pliers, a ring or a hook. The various types of hooks can duplicate some of these functions when attached to arm prostheses, which, in turn, are usually controlled by the contralateral shoulder. The single hook is a simple and seemingly primitive type of restoration; nevertheless it can be extremely effective. I have seen a man who lost both arms almost at the shoulder use one of these single hooks at the end of each stump, without benefit of the regular arm-length prostheses. With these hooks he could dress himself entirely and perform many of the activities of daily living.

The split utility hook is, of course, a vast improvement. The two prongs of the split hook, operating against each other, provide a considerable degree of prehensile ability and can be used in many vocational activities. Workers who require dexterity in the performance of their tasks, rather than cosmetic restoration, do very well with this type of prosthesis.

The dress hand, as its name implies, is used chiefly by those who desire a prosthesis of good appearance and are willing to sacrifice function. Some of the dress hands achieve a remarkably lifelike appearance, but since there is usually noth ing they can do, the dead appearance o the hand soon gives it away. However women and men whose profession it is t meet the public are often fitted with thi type of prosthesis with very satisfactor results.

The mechanical hand is a complicated gadget, and this is its chief disadvantage. The more parts there are to a tool, the more things can go wrong with it. Simplicity is highly desirable, even at the sacrifice of some functional ability. The mechanical hand is an attempt to duplicate the function and, to some extent, the appearance of the natural hand, but, because it is heavy and cumbersome, many amputees discard it. It should be recommended only after due consideration of its faults as well as its virtues.

Cineplasty is a technic that I have used with considerable success for many years. It is especially suitable for bilateral arm amputees, and in cases of disarticulation of the shoulder it is the only means by which a functional prosthesis can be utilized. Briefly, the cineplastic technic is this: The live muscle remaining in the stump is canalized and lined with skin which has been sutured to form a tube, fascia side out. The surgical defect is covered with a graft, and, after healing has taken place, the amputee is left with a canal in his muscle through which an ivory or plastic peg can be inserted. This peg, attached to the prosthesis by a system of levers, is moved by the contractions of the muscle and so activates the artificial arm in an extremely natural manner. The operation can be performed in the muscles of the forearm of a below-elbow amputee, in the biceps muscle if the amputee has lost his elbow, or even in the pectoral muscle if the amputee has a very short stump or has suffered disarticulation of the shoulder.

The cineplastic prosthesis can be worn either with a hand or with hooks. The hand looks very lifelike and has considerable functional ability. Usually it is all that is necessary to satisfy the demands of women, children and men who are not

engaged in work requiring dexterity. However, the split utility hook used in connection with the cineplastic prosthesis provides more prehensile ability and control. I am acquainted with a bilateral arm amputee who is able to play the piano professionally, using the cineplastic arm fitted with specially made split utility hooks.

The Krukenberg technic is a surgical procedure designed to provide prehensile ability without necessitating use of a prosthesis. It is therefore especially desirable for blinded bilateral arm amputees, who must retain tactile sensation in one stump for orientation and for reading braille. In this technic the forearm is split into radius and ulna and the two bones covered with skin. The action of the bones against each other thus provides a simple grasping tool. This technic is not as popular in the United States as it is in Europe, chiefly because of its poor appearance. However, it is extremely successful and necessary for blind people. One of my patients was a young man who had lost his sight and both arms in a land mine explosion. He was fitted with a cineplastic prosthesis on the stump of what had been his dominant arm, and the Krukenberg technic was performed on the other stump. He learned to read braille and perform many of the activities of daily living despite his severe multiple disability.

Several recent developments in the field of arm prostheses are worthy of note. One is the electrical arm now being developed and studied in the United States by a commercial company, International Business Machines. The arm presently being studied is the third developed under the project. In 1949 it was fitted to amputee consultants and is still being worn by them, although the arm is not yet available to amputees not connected with the project. The electrical section furnishes motive power to flex and extend the elbow and wrist, to rotate the hand and to close and open the fingers and thumb. Control signals are supplied by pneumatic impulses from an insole in the amputee's shoes and are trasmitted to a small but powerful motor in the forearm shell. A natural-appearing hand has been developed, which yields good functional results without sacrificing the cosmetic value of the prosthesis. It should be emphasized that this work is still in the experimental phase, but the electrical arm shows promise of future importance when perfected.

Another electrical arm is being developed in Germany which utilizes the phantom limb to transmit impulses to the prosthesis. This persistence of sensation in the ablated part has generally been regarded as an unmixed evil by physicians, and various technics have been used to remove the sensation, with little success. Now it appears that this sensation can be used constructively. Amputees who have experimented with this type of prosthesis have reported satisfaction with it, and it may prove to be an important step forward in the continuing search for an arm adequate to meet the needs of arm amputees.

It can be seen that the chief factor in rehabilitation of the arm amputee is selection of a prosthesis to meet the patient's particular needs. For this reason the physician should be acquainted with all the types of prosthesis available, so that he can assist his patient to choose his prosthesis wisely, realistically, and with due consideration for all of the factors involved.

However, the provision of a prosthesis is not enough; the patient must be taught to use his new arm comfortably to meet his vocational and social requirements, and to achieve self-care and independence. If the amputee patient is receiving the benefits of treatment at a modern rehabilitation center, occupational therapy will provide training in the use of the prosthesis and job exploration if a new career is necessary because of the amputation. One of the most successful training media is a device called a "Demands of Daily Living Training Board." Various utilities, such as door openers, light switches of various kinds, telephone handles, eating utensils and grooming utensils are arranged on the board. The amputee devel-

ops his skill to meet real-life situations with the assistance of a board of this kind, and the board also provides a means of testing the amputee's ability to return to a normal life situation.

Rehabilitation of the arm amputee demands time, thought and skill. Nevertheless, with patient and physician cooperating to achieve the best possible results, men and women who have lost one or both upper extremities can be returned to their homes and their jobs confident of their ability to perform adequately on the job and in the community.

SUMMARY

Rehabilitation of the arm amputee must be viewed as an integrated process of care which takes into consideration the total requirements of the patient as an individual. While in the case of the leg amputee one fits the prosthesis to the patient's stump, in the case of the arm amputee one fits it to his entire personalty. The physician must therefore have an array of devices and technics from which to choose, and should make his selection on the basis of the patient's vocational and social needs.

Some of the devices discussed in detail are the single hook, the split utility hook, the mechanical hand, the dress arm, the cineplastic technic, and rehabilitation without prosthesis, e.g., with the Krukenberg procedure. Patients with multiple or complicated disabilities must receive the benefit of special technics adapted to their total requirements.

The arm amputee must be carefully trained to utilize his prosthesis to meet the demands of daily living and the requirements of the job to which he will return.

RESUMEN

La rehabilitación del brazo amputado debe mirarse como un proceso en el que se toma en consideración el requerimiento total del paciente como individuo. En el caso de la pierna amputada se coloca la prótesis en el muñón del paciente, pero en el caso del brazo amputado ésta se coloca en su personalidad entera. Por consiguiente, el médico debe disponer de recursos y técnicas y hacer su selección sobre la base de las necesidades vocacionales y sociales del paciente.

Se discuten en detalle algunos de los recursos, como el gancho sencillo, el gancho hendido, la mano mecánica, el brazo aparente, la técnica cineplástica y la rehabilitatión sin prótesis, v. g., con el procedimiento de Krukenberg. Los pacienties con incapacidades mùltiples o complicadas deben recibir el beneficio de técnicas especiales adaptadas a sus requirimientos totales.

El brazo amputado debe adiestrarse cuidadosamente para utilizer su prótesis, de conformidad con las necesidades de la vida diaria y los requerimientos del trabajo al que habrá de volverse.

SUMARIO

A reabilitação do individuo com amputação de braço deve ser encarada como um processo unitario de cuidados que leve em consideração as necessidades totais do enfermo como um individuo. No caso de perna amputada adapta-se a protese ao côto do paciente; no caso de braço amputados nos a adaptamos a sua inteira personalidade. O medico precisa portanto ter uma serie de peças e tecnicos entre as quais escolher e deve fazer sua seleçao com pase nas necessidades sociais e vocacionais do paciente.

Algumas das peças discutidas em detalhe são o simples gancho, o gancho bipartido de varias utilidades, a mão mecanica, or braço vestido, a tecnica cineplastica e a reabilitação sem protese, como por exemplo o processo de Krukenberg. Pacientes com multiplas ou complicadas incapacidades devem receber o beneficio de tecnicas especiais adaptadas as suas necessidades totais. O braço amputado deve ser cuidadosamente treinado afim de utilizar sua protese no encontro das necessidades da vida diaria e do trabalho para o qual ele vai voltar.

RÉSUMÉ

La rééducation des patients amputés d'un bras doit être envisagée comme un procédé de première importance dans le soin des patients en tant qu'humains. Dans le cas d'amputation d'une jambe, il convient de bien adapter le prothèse; dans les cas d'amputation d'un bras, ill convient de rétablir l'entière personnalité. Le chirurgien doit avoir, pour cette spécialité, un étalage de méthode et de moyens parmi lesquels il peut choisir, selon le cas et le rang social du patient.

L'auteur énumère certains moyens, comme le crochet simple, le crochet à flexion, le main mécanique, le bras de linge, la technique cinéplastique et la rééducation sans prothèse e.g. avec le procédé de Krukenberg. Le patient, avec une seule ou avec plusieurs infirmités, est en droit de recevoir le bénifice de techniques spéciales. Un patient au bras amputé doit être entraîné à utiliser son prothèse afin de pouvoir reprendre ses tâches quotidiennes.

ZUSAMMENFASSUNG

Die Wiederherstellung eines Armamputierten muss als ein einheitlicher Behandlungsplan aufgefasst werden, der allen Anspruechen des Kranken als Individuum gerecht zu werden versucht. Im Falle eines Beinamputierten wird die Prothese an den Stumpf des Kranken angepasst; im Falle des Armamputierten wird die Prothese der Gesamtpersoenlichkeit angepasst. Dem Arzt muss daher ein Arsenal von Apparaten und Techniken zur Verfuegung stehen, deren er sich auf Grund der beruflichen und sozialen Beduerfnisse des Kranken bedienen kann.

Unter den im einzelnen eroerterten Vorrichtungen befindet sich der Einzelhaken, der gespaltene Gebrauchshaken, die mechanische Hand, der Kunstarm, die kineplastische Technik und die Rehabilitierung ohne Prothese, z.B. mit Hilfe des Krukenbergschen Verfahrens. Kranken mit mehrfachen oder komplizierten Behinderungen muss man die Segnungen besonderer den Gesamtbeduerfnissen angepassten Techniken zukommen lassen.

Der Armamputierte muss im Gebrauch seiner Prothese sorgfaeltig trainiert werden, um den Anforderungen des taeglichen Lebens und seines Berufes gerecht werden zu koennen.

RIASSUNTO

La riabilitazione dei monconi di braccio deve essere considerata come procedimento di cura integrativo che ha per mira tutte le necessità del paziente preso come individuo. Nel caso di una amputazione di gamba si mette una protezi sul moncone, e questo è tutto; nel caso di un braccio amputato mettere una protesi significa influire su tutta la personalità dell'individuo. Il medico deve, quindi, avere tutto un campionario di attrezzi e di tecniche fra cui scegliere, e dovrebbe fare la sua scelta in base alle attitudini e alle necessità sociali del paziente.

Alcuni fra i dispositivi descritti in dettaglio sono l'uncino semplice e a presa, la mano meccanica, il braccio, la tecnica cineplastica e la riabilitazione senza protezi come col metodo Krukenberg. Un malato con lesioni multiple o complesse deve essere trattato con speciali tecniche adatte alle sue necessità generali. Un braccio amputato deve essere allenato con cura alla sua protesi in modo da poter andare incontro alle necessità della vita di ogni giorno e del lavoro a cui è destinato.

Evaluation of Urologic Pain

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DISEASES and abnormalities of the urogenital tract in the male and of the urinary tract in the female, whatever the age of the patient, are the concern of the urologist. The distinctive fundamental characteristic of urology is the association, developmentally and anatomically, of two entirely different processes—excretion and reproduction. These processes involve an abundance of involuntary muscle fibers, secreting glands and arterioles, the nerve supply being obtained from both the cerebrospinal and the autonomic system as high as the sixth dorsal nerve, extending down through the sacral nerves, and from the many plexuses located in this region.[1] Because of this interlocking distribution of the urologic nerve supply, the location of pain, its character and its relation to points of tenderness all have clinical significance, but they are not to be considered pathognomic. Over 50 per cent of the pain associated with urologic conditions is evidenced some distance from the seat of the disease process, affording some of the most striking examples of referred or reflected pain, but in each case the painful area coincides with the distribution of the sensory nerve fibers in the peripheral nerves or the corresponding segments of the cord.[2] One must bear in mind, however, that some of the nerve fibers are distributed to one or more adjacent structures. Such areas of distribution, whether of peripheral nerves or of segments of the cord, shows marked overlapping, which explains the indefinite and variable character of pain frequently produced by diseases of the urinary tract.

The majority of urologic patients seek treatment because of pain. No matter how typical the sensation or location of pain is demonstrated to be, it is never a safe basis upon which to rest a diagnosis. One must first determine whether the pain is due to local manifestations or referred from some distant or internal pathologic condition. As has been stated, most urologic pain is referred and not prone to be localized at the seat of the involvement.

Most urologic pain is primarily caused by spasm,[3] though some changes in the renal parenchyma, bladder, prostate gland, and external genitalia do not so assert themselves. Urologic lesions most frequently cause referred pains which are identical with pains considered typical of lesions in other viscera. This identical pattern is due to the origin and distribution of the nerve supply. The autonomic nerve supply extends to all hollow organs and tubes, and the supply to the ureter, the kidney and all abdominal viscera ends in the same segments of the spinal cord.

An imbalance of the autonomic nervous system is a common cause of pain in the lower quadrants of the abdomen, as well as renal pain without demonstrable organic changes.[4]

One of the two characteristic types of renal pain is usually present: (1) a dull, almost continuous ache, or (2) sharp, colicky pain in the costovertebral angle, often radiating.

The dull backache, being caused by pulling and stretching of the capsule, is felt high, at the costovertebral angle, confining itself to a circular area 8 to 10 cm. in diameter, with an occasional radiation impulse to the abdomen anteriorly. It has been said that the patient who describes his pain by placing his thumb at the costovertebral angle and his forefinger anteriorly deserves more than routine attention to the kidney, even in the face of negative results from urinalysis and urologic study.[5] If this pain remains

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localized without being radiating or being referred, it is characteristic of perirenal lesions.

Renal and ureteral pains are closely related. Many of them are due to demonstrable calculi, and yet many cases are encountered in which calculi cannot be demonstrated roetgenograhically, even when both white and red blood cells are present in the urine. When the outflow of urine is impaired, the musculature behind and above the lesion, be it calculus or any other, is called upon to undertake some measure of extracurricular effort, so to speak, to promote the outflow of urine. Urine does not come down the ureter gravitationally; it is ejected, and ejected with a certain amount of force.[6] An impediment will result in derangement of the propelling apparatus, which may or may not overcome the obstruction. The best interest of the patient is served by making a thorough urologic study to determine the cause in the individual case, so that the necessary steps may be taken to prevent possible insidious renal damage later. The late Dr. John James Hunter, of Montgomery, Alabama, who himself passed a calculus from the kidney pelvis down the ureter in 1897, stated: "Men have committed suicide to end its pain, and women have aborted because of it."[7] Obstructive distention of the ureter, since it affects first the pelvis and then the renal capsule, is regarded as the basis of all renal colic of ureteral origin. Spasm associated with this condition can either exist alone or be secondary to other pathologic distrubances. These pathologic conditions may be (1) intraureteral abnormalities, such as detritus, blood clots or calculi; (2) lesions in the wall of the ureter, e.g., primary carcinoma, ureteritis, stricture, polyps, or ureterovesical cysts, or (3) extra-ureteral conditions, such as kinks or angulation of the ureter from bands or aberrant vessels, ureteral adhesions or adjacent pathologic change exerting pressure against the ureter.

Ureteral colic manifests itself as a severe, knifelike intermittent pain. It may be centered anywhere between the flank and the groin, with or without radiation to the corresponding testes, the labia or the anterior aspect of the thigh. The lesion may be constantly or intermittently fixed, according to its mobility.[8] The location of the obstruction largely determines the location of the pain and its direction of radiation. If the involvement is in the upper part of the ureter the pain is apt to be in the corresponding flank, descending into the groin as lower levels become involved. When the obstruction is in the upper two-thirds of the ureter, sharp colicky pain between the anterior portion of the flank and the corresponding lower abdominal quadrant is the rule, but reflex irritation via the solar plexus may cause an associated gastric disturbance, or this disturbance may exist as a separate entity. In the presence of unilateral renal disease the renorenal reflex manifests itself when the renal pain is transferred across the cord and felt on the opposite side of the body as though originating in the healthy kidney. In some cases the obstructing process slowly descends; in others obstruction is not set up until the lower third of the ureter is reached, and this may be at the beginning of the intramural portion of the ureter if the iliac vessels, with or without associated pathologic change, do not lend assistance to overcome the obstructing mechanism. The pain descends as the site of the obstruction descends, with radiation as aforedescribed. Thus, in a reflex manner, the early vesical symptoms of renal tuberculosis may be caused partly by the irritation of an incipient infection of the lower part of the ureter. If the obstruction is at the beginning or within the intramural portion of the ureter there may be marked symptoms of urgency referable to the bladder—frequency and urgency of urination, and also dysuria. Lesions of the ureter near the bladder may cause pain on defecation, ejaculation and urination, a triad of symptoms described years ago by the famous urologist Hugh Hampton Young as pathognomic for stone in the intramural portion of the ureter.[1]

Normal micturition is a result of team-

work between the detrusor and sphincteric muscles, producing conscious, voluntary and painless complete emptying of the bladder. Some abnormality of this process is a common complaint of many patients with diseases of the urogenital tract. The developmental connection of trigone, urethra and ureter is important in any analysis of vesical pain. Intravesical lesions are either within the viscus (papillomas), or within the bladder wall (Hunner's ulcer, or interstitial cystitis), and produce the more severe and constant pains in the bladder.[9] Sclerosing processes develop in some cases after frequent or prolonged infection, primary or secondary, of the bladder, or from therapeutic accidents. In these cases the pain is intolerable; it provokes distressing diurnal and nocturnal frequency, for which therapeutic measures are of little or no avail. The trigone is the most sensitive region of the bladder, and the most painful lesions are those which encroach upon this area. Extravesical causes of bladder pain occur when there are adhesions binding it to the rectum or the sigmoid. These are aggravated by defecation. Should the adhesions bind the bladder to the uterus or the tubes, the symptoms are more marked during menstruation, pregnancy and sexual intercourse.

Most pains originating in the prostate are referred or reflected pains.[10] The close association of the nerve supply of the vas and vesicle with that of the prostate, together with the free anastomosis of their respective plexuses, allows pain of prostatic origin to be referred to any part of the body below the diaphragm. Pain over the sacrum or lower part of the back is not only the most frequent symptom but is quite characteristic of prostatitis. Local prostatic pain is closely related to micturition. If it is associated with trigonitis, there is marked frequency of urination, accompanied by severe pain and tenesmus at the end. If the pain occurs at the beginning and continues all through micturition, the prostatitis is associated with posterior urethritis. This pain may be referred to the glans penis. In most cases of prostatitis the vesicles are also involved. In the female, whether disease is or is not present in the pelvis, the urethra is homologous to the prostate. The prostate and vesicles rank next in importance to the teeth and tonsils as focal infective points. Disease of the seminal vesicles is not an uncommon cause of suprapubic pain.

Pain in the testes or the epididymus is sufficiently localized and associated with local tenderness to be readily recognized. Intermittant attacks of intense pain may follow trauma without demonstrable injury. Referred testicular pain from lesions of the ureter is prone to be intermittent and sharp, rather than continuously aching and sickening. Pain due to disease of the vesical neck, or pressure originating at the vesical neck and its adnexa, usually resembles neuralgia, but is often sharp and intermittent. Prolonged unrelieved sexual excitement is a common cause of testicular pain, which resembles neuralgia but is of short duration. The skin of the scrotum is supplied by the genital branch of the genitocrural nerve and is therefore not necessarily tender in the presence of a testicular lesion; accordingly, in the presence of colic of high uretral origin the tunica vaginalis of the testes is sensitive to pressure but the scrotum is not. Conversely, if the ureteral colic is low in the ureter, the scrotal skin is alone or also sensitive.

Obstructive distention of the ureter, involving the renal pelvis and later the renal capsule, is regarded as the basis of all renal colic of ureteral origin. Antiperistalsis is no doubt a factor in some cases. The suddenness of the change producing or intensifying the obstruction serves to influence the intensity of the pain. Ureteral calculi fixed in position may remain indefinitely, causing neither ureteral nor renal pain, and small calculi can pass out unnoticed and without symptoms. Pain, therefore, is by no means indicative of the onset of disease, but is brought about by some change, such as infection, in the course of an old progressive lesion formerly painless.

Fortunately, in a very large percentage of cases a painstaking history, together with modern urologic methods of diagnosis, enables the urologist to make an accurate diagnosis and often to relieve the presenting symptoms. There are painful pathologic conditions of the kidney which cannot be detected by the most careful repeated urologic study, and exploration of the kidney, which is not a dangerous procedure, may become necessary. In all patients with pain that simulates ureterorenal disease, when there is no evidence of pathologic change in the urinary tract to account for the symptoms observed, one must remember that somatic pain produced by fibrolipomatous nodules is known to simulate that caused by pathologic lesions of the urinary tract.[11] Careful examination of the back and the spinal column may reveal a somatic cause for the pain in a spinal deformity or a fibrolipomatous nodule. Such a nodule is easily palpated unless the patient is extremely obese, and is painful to pressure. With the region under local anesthesia, pinching the exposed nodule causes radiation of pain to the ureter, the kidney or the testicle, depending upon the segmental location of the nodule.

Careful neurologic histories are of the utmost importance in the diagnosis of pain when urologic study reveals no abnormality. In evaluating pain in the urogenital organs, it must be kept in mind that ruptured intervertebral discs and lesions of the cord may produce nerve root pain, which could radiate to them through their nerve supply. Such other cord lesions as benign and malignant tumors, varices, angiomas and tuberculomas may produce nerve root pain. The line of demarcation between the pain of these conditions and that caused by lesions in the urinary tract is not clear-cut. Not only these, but inflammatory conditions, such as chronic arachnoiditis, pachymeningitis, herpes zoster or chronic ganglionitis, must be kept in mind. Irritation of the nerve roots and trunks produces segmental pain and tenderness in the majority of cases. Painful stimuli of visceral disease may produce segmental pain, but not segmental tenderness. When the behavior of the autonomic nervous system is better understood, the understanding and interpretation of pain will be greatly improved.

SUMMARY

A generalized résumé of the nerve supply to the urogenital tract is given. The causes of referred pain are stated. Pain felt anywhere along the distribution of these nerves is not a disease for which medication is prescribed, but a symptom requiring further and more complete urologic study in order to interpret the condition properly and determine its underlying cause. The importance of recognizing nerve root pain and differentiating it from true urologic pain is mentioned. The manner in which segmental fused with urologic pain when the nerve supply is from the same cord segment is stressed. Urologic pain does not always begin with the disease process.

RÉSUMÉ

L'auteur nous donne un résumé général sur l'innervation de l'appareil urogénital. Les causes de la douleur sont énumérées. La douleur se manifeste sur une partie quelconque des nerfs et n'est pas une raison de soigner médicalement, mais ce symptôme requiert une étude plus approfondie sur l'appareil urinaire, afin d'en déceler la cause. L'Auteur mentionne l'importance de savoir différencier la douleur proprement dite de la douleur urologique. Il nous montre comment l'on peut prendre l'une pour l'autre, alors que la douleur urologique n'est pas toujours due à une maladie.

SUMARIO

E dado um resumo geral da inervação do aparelho urogenital. As causas de dôres queixadas pelos pacientes são estabelecidas. A dôr sentida em qualquer sitio ao longo da distribuição desses nervos não é uma doença para a qual a medicação seja prescrita, mas um sintoma que requer

ulterior e mais completo estudo urologico, em ordem a interpretar a condição propriamente dita e determinar sua causa obscura. A importancia de se reconhecer a dôr de raiz nervosa e diferencial-a de verdadeira dôr urologica é mencionada. E realçado como a dôr segmentaria pode ser confundida com a dôr urologica quando a inervação é do mesmo segmento. A dôr urologica não começa sempre com o processo patologico.

RIASSUNTO

Viene tratteggiato un quadro della innervazione del sistema urogenitale. Vengono stalibite le cause del dolore: un dolore avvertito in un punto qualunque di questa rete nervosa non è una malattia che richieda un farmaco ma un sintomo che impone ulteriori e più complete ricerche allo scopo di riconoscere esattamente la lesione primitiva e di stabilirne le cause. Viene messa in evidenza l'importanza di distinguere un dolore da radici nervose da un dolore urologico vero. Viene spiegato come sia possibile confondere un dolore segmentale con un dolore urologico quando le terminazioni nervose provengono dalla stessa origine. Il dolore urologico non sempre origina con il processo morboso.

ZUSAMMENFASSUNG

Es wird eine allgemeine Uebersicht ueber die Nervenversorgung des Urogenitalsystems gegeben. Die Ursachen des fortgeleiteten Schmerzes werden dargelegt. Schmerzen im Bereich des Verteilungsgebietes dieser Nerven sind keine Krankheit, fuer die man ein Mittel verschreibt, sonder ein Symptom, das weitere sorgfaeltige urologische Untersuchung mit dem Ziele genauer Deutung der Erkrankung und der Bestimmung ihrer Ursache fordert. Die Bedeutung der richtigen Erkennung von Wurzelschmerzen und ihrer Unterscheidung von echten urologischen Schmerzen wird erwaehnt. Es wird betont, wie leicht ein Querschnittsschmerz mit von den Harnorganen ausgehenden Schmerzen verwechselt werden kann, wenn die Nervenversorgung aus dem entsprechenden Segment entspringt. Schmerzen in den Harnorganen setzen nicht immer im Beginn der Krankheit ein.

RESUMEN

Se hace un resumen general de la inervación del tracto urogenital. Se exponen las causas del dolor referido. El dolor acusado en cualquier punto de la distribución de estos nervios no es una enfermedad que amerite medicación, sino un síntoma que requiere mayor y más completo estudio urológico, para interpretar propiamente la condición y determinar su causa fundamental. Se menciona la importancia de reconocer el dolor radicular y diferenciarlo del verdadero dolor urológico. Cuánto dolor segmentario puede confundirse con dolor urológico, cuando la inervación procede del mismo segmento medular. El dolor urológico no siempre comienza con el proceso patológico.

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Transactions of the

Eighth International Congress

of the

International College of Surgeons

Madrid, Spain

May 19-24, 1952

with Reunions at

Barcelona, Bordeaux, Vienna

and Amsterdam

Prof. Dr. A. de la Fuente Chaos, Secretary-General of the Madrid Congress.

The Eighth International Congress

International College of Surgeons

MADRID, SPAIN, MAY 19-24, 1952

THE Eighth International Congress of the International College of Surgeons, held at the Faculty of Medicine of the University of Madrid, Spain, May 19 to 24 inclusive, 1952, was not only one of the most rewarding but one of the most spectacular experiences in College history. Since accessory meetings were held before and after the Congress in Barcelona, Bordeaux, Vienna and Amsterdam, it was actually not only an international scientific conference but a scientific grand tour of Europe, an almost bewildering pageant in which ancient and medieval splendor, immemorial tradition, and the historic dignity of the past alternated continuously with the accelerated tempo of today, the innumerable recent developments in medical and surgical technic, and the sharply modern concept of the universality of science.

It was obvious from the outset that the tragic vicissitudes undergone in the past three decades by all the major centers

The Faculty of Medicine in Madrid, scene of the Eighth International Congress of the International College of Surgeons.

Meeting of the International House of Delegates of the International College of Surgeons. On the dias, from left to right, are Dr. Jorge A. Taiana of Buenos Aires (speaking); Dr. Manual A. Manzanilla of Mexico, D.F.; Dr. Raffaelo Paolucci of Rome; Dr. Henry W. Meyerding of Rochester, Minnesota; Dr. Francisco Graña of Lima, Peru; Dr. Hans Finsterer of Vienna (presiding); Dr. Max Thorek of Chicago; Dr. Martin Lagos of Madrid; Dr. Carlos Gama of São Paulo, Brazil, and Dr. A. de la Fuente Chaos of Madrid.

of learning in Europe have not erased or even dimmed the light of scientific progress. The intellectual stimulation always to be expected from contact with the scholarly, disciplined European surgeons is as strong as ever.

The Congress, together with the meetings in Barcelona, Madrid, Vienna and Amsterdam, attracted nearly 5,000 persons from all over the world, all of whom expressed unstinted enthusiasm for the excellent scientific programs and the delightful social events prearranged for their pleasure.

Prof. Dr. F. Martin Lagos, President of the Spanish Section, and Prof. Dr. A. de la Fuente Chaos, Secretary General, were the presiding officers of the Congress; Prof. Dr. Hans Finsterer of Vienna occupied the chair at the official sessions. The Congress in general was organized by the Spanish Section of the College and conducted under the auspices of the Spanish government. On the Committee of Honor were chiefs of the ministeries of justice, education, labor, commerce, information and health, as well as many other dignitaries, including the Rector of the Central University. From the inaugural session to the closing reception, the delegates saw abundant evidence of the efforts that added so much to their satisfaction and enjoyment. The spirit of hospitality everywhere evident in Madrid was recognized and warmly appreciated by the attending surgeons. The Spanish

newspaper *Information Nacional* reported: "Over 5,000 surgeons from all over the world attended the Eighth International Congress of the International College of Surgeons in Madrid. . . A moving tribute to Spanish culture and to Don Santiago Ramon y Cajal, the famed Spanish histologist, formed a symposium. Descriptions of the Congress also appeared in *Domus Medici* and many other Continental publications. The *Domus Medici* report carried extensive comment on the color television presentations which were a prominent feature of the Congress and is quoted at some length in the editorial on Page 615 of this issue. The television program was under the able supervision of Prof. Dr. A. de la Fuente Chaos, Secretary of the Eighth International Congress Committee.

House of Delegates Meeting: The International House of Delegates of the International College of Surgeons met in Madrid on Monday, May 19, in the Building of the Superior Council of Scientific Investigations. The meeting was called to order by Prof. Dr. Hans Finsterer, President-Elect. There was a large attendance. The roll call of officers and delegates follows:

Prof. Dr. Hans Finsterer, President-Elect
Vienna, Austria
Dr. Lyon H. Appleby
Vancouver, B. C., Canada
Dr. Charles M. Arnold (P)
Lincoln, Nebraska
Dr. W. W. Babcock
Philadelphia, Pennsylvania
Mr. Hamilton Bailey (P)
London, England
Dr. Moses Behrend
Philadelphia, Pennsylvania
Prof. Jacob Bitschai
Alexandria, Egypt
Prof. Dr. Alfredo Borjas
Caracas, Venezuela
Prof. Dr. Martial Bourand (P)
Port au Prince, Haiti
Dr. Eurico Branco Ribiero
São Paulo, Brazil
Dr. James T. Case (P)
Santa Barbara, California
Dr. José Avelino Chaves (P)
São Paulo, Brazil
Dr. André Crotti (P)
Columbus, Ohio

Prof. Dr. A. de la Fuente Chaos addressing the opening session of the Congress of Madrid.

Brig. M. M. Cruickshank (P)
Aberdeen, Scotland
Prof. Don Victor Cónill Montobbio
Barcelona, Spain
Dr. Rustum N. Cooper
Bombay, India
Prof. P. T. Crymble (P)
Belfast, Ireland
Prof. Dr. Raymond Darget
Bordeaux, France
Dr. Vernon T. De Vault
Washington, D. C.
Dr. Donald Dickerson (P)
Danville, Illinois
Prof. Dr. Mario Dogliotti
Turin, Italy
Prof. Dr. Francisco Fonseca Garcia
Mexico, D. F.
Prof. Dr. Francisco Graña
Lima, Peru
Dr. J. P. Greenhill (P)
Chicago, Illinois
Dr. Elmer Hess
Erie, Pennsylvania
Prof. Dr. Arthur Hübner
Berlin, Germany
Prof. Dr. Oscar Ivanissevich (P)
Buenos Aires, Argentina
Dr. Henry H. Kessler
Newark, New Jersey
Prof. Dr. G. E. Konjetzny
Hamburg, Germany
Dr. Earl O. Latimer (P)
Chicago, Illinois
Prof. Dr. Lucien Leger
Paris, France
Prof. Dr. Albert Lezius
Hamburg, Germany
Dr. Manuel E. Lichtenstein (P)
Chicago, Illinois
Dr. J. Heng Liu (P)
Taiwan, Formosa
Dr. William Randolph Lovelace (P)
Albuquerque, New Mexico
Dr. Fernando Luz, Filho (P)
Salvador, Brazil
Dr. William Carpenter MacCarty, Sr. (P)
Rochester, Minnesota
Dr. D. U. MacGregor
Hamilton, Ontario, Canada
Prof. Dr. Felix Mandl (P)
Vienna, Austria
Prof. Dr. Manuel A. Manzanilla
Mexico, D. F.
Prof. Dr. Henry W. Meyerding
Rochester, Minnesota
Prof. Dr. Lucas Monteiro Machado
Belo Horizonte, Brazil
Gen. Emanuel Marques Porto (P)
Rio de Janeiro, Brazil
Prof. Dr. Rudolph Nissen
Vienna, Austria
Basel, Switzerland
Prof. Dr. Cesar A. Pantoja (P)
Bogotá, Colombia
Prof. Dr. Raffaele Paolucci
Rome, Italy
Dr. Morris L. Parker (P)
Chicago, Illinois
Prof. Dr. Esteban Paulin P)
Queretaro, Mexico
Dr. Louis F. Plzak (P)
Chicago, Illinois
Prof. Dr. Raoul David de Sanson (P)
Rio de Janeiro, Brazil
Prof. Dr. Leopold Schönbauer
Vienna, Austria
Prof. Dr. José Soler-Roig
Barcelona, Spain
Prof. Dr. Enrique St. Loup B. (P)
La Paz, Bolivia
Prof. Dr. Jorge A. Taiana
Buenos Aires, Argentina
Prof. Dr. Max Thorek
Chicago, Illinois
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Naples, Italy
Dr. Manuel N. Tuason
Manila, Luzon, P. I.
Prof. Dr. Augusto Wybert
Buenos Aires, Argentina

Other Voting Delegates from Sections: The following delegates were also present and participating:

Argentine Section
Dr. Abel N. Canonico
Buenos Aires
Dr. Roberto Angel Goyenechea
Buenos Aires

Brazilian Section
Dr. Matheus Santamaria
São Paulo
Dr. Oswaldo Borges Costa
Belo Horizonto
Prof. Dr. Rodolpho de Freitas
São Paulo

Canadian Section
Dr. Stewart A. Wallace
Kamloops, British Columbia

Colombian Section
Dr. Pedro Eliseo Cruz
Bogotá

Finnish Section
Prof. Y. Seuderling
Helsinki

French Section
Prof. Raymond Darget
Bordeaux, France

German Section
Prof. Dr. Albert Lezius
Hamburg, Germany

Haitian Section
Prof. Martial Bourand
Port-Au-Prince, Haiti

Honduras Section
Dr. José Ramon Duron
Tegucigalpa
Dr. Abelardo Pineda Ugarte
Tegucigalpa

Indian Section
Dr. B. N. Rao
Gwaloir, India
Col. K. G. Pandalai
Bombay

Prof. Dr. Taiana of Buenos Aires addressing the House of Delegates.

Israeli Section
Dr. Bernhard Neumann
Jerusalem

Italian Section
Prof. Antonio Bobbio
Torino, Italy

Mexican Section
Prof. Dr. Francisco Fonseca Garcia
Mexico, D. F.
Prof. Dr. Manuel A. Manzanilla
Mexico, D. F.

Netherlands Section
Dr. George Chapchal
Utrecht, The Netherlands

Pakistan Section
Dr. M. A. H. Siddiqi
Lahore
Dr. Habib Patel
Karachi

Philippine Section
Dr. Domingo Antonio
Manila

Spanish Section
Prof. Dr. Alfonso de la Fuente Chaos
Madrid, Spain
Prof. Dr. Francisco Martin Lagos
Madrid, Spain

Turkish Section
Prof. Dr. Dervis Manizade
Istanbul

United States Section
Dr. Edward L. Compere
Chicago, Illinois
Dr. Roger Anderson
Seattle, Washington
Dr. Arnold S. Jackson
Madison, Wisconsin

Venezuelan Section
Prof. Dr. Alfredo Borjas
Caracas, Venezuela

Approval of Minutes: The Minutes of the meeting of the International House of Delegates, held during the Seventh International Assembly on Thursday, Aug. 3, 1950, in Buenos Aires, were approved, as were all the Minutes of the interim meetings of the Executive Council and the Board of Trustees of the International College of Surgeons since that date, and fully ratified in accordance with Article III, Section 8, of the Bylaws of

the International College of Surgeons.

Amendments: It was moved, seconded, and carried that all amendments to the Constitution and Bylaws of the International College of Surgeons, the Constitution and Bylaws of the United States Section and amendments to the Constitution and Bylaws of all other Sections which have been approved by the International Board of Trustees since Aug. 30, 1950, be ratified and approved by the International House of Delegates.

Prof. Dr. Hans Finsterer appointed the following nominating committee:

Prof. Dr. Francisco Graña, Lima, Peru, Chairman
Prof. Dr. Harry E. Bacon, Philadelphia, Pennsylvania
Prof. Dr. Raymond Darget, Bordeaux, France
Mr. James F. Brailsford, Birmingham, England
Prof. Dr. Albert Lezius, Hamburg, Germany

As President-Elect, Prof. Dr. Finsterer spoke warmly of the accomplishments of the College and expressed regret at the necessity of his substitution for the late Dr. Herbert Acuff. In memory of Dr. Acuff and in respect for his achievements the audience stood in silence and contemplation. Addresses were then made by the President of the Spanish Section, Prof. Dr. Francisco Martin Lagos, and the Secretary, Prof. Dr. Alfonso de la Fuente Chaos. Prof. Dr. Manuel A. Manzanilla, Mexico, D. F., of the Ibero-American Affairs Committee, outlined the activities of the various Spanish-American Sections of the College. Prof. Dr. Max Thorek, Founder and International Secretary General, gave a review of the activities of the College. Prof. Dr. Rudolph Nissen, Chairman of the Committee on European Affairs and Director of the Department of Surgery at the University of Basel, Switzerland, spoke of the advances made in Europe and the creation

Dr. Edward L. Compere of Chicago addressing the House of Delegates.

Prof. Dr. Finsterer of Vienna addressing the opening session of the Eighth International Congress at Madrid.

and activities of the European Sections.

Treasurer's Report: The Treasurer's report was then read, and the financial structure of the College was recorded. The Auditor's report was approved and placed in the archives of the College with the original minutes. Prof. Dr. Carlos Gama, President of the Brazilian Section, spoke glowingly of accomplishments in Brazil, of the rapid growth of the Brazilian Section, and of the meeting of the Brazilian Section in São Paulo. He presented an invitation from the Governor of the State of São Paulo to hold the next International Congress of the International College of Surgeons (1954) in São Paulo. This was approved with much applause and acclaim.

Prof. Gama further reported that plans are being completed for building the Home of the Brazilian Section of the International College of Surgeons in São Paulo and that funds and grounds for the purpose are available. Work will proceed promptly. The International College of Surgeons has contributed a sum of money to aid in this undertaking.

Prof. Dr. Francisco Graña, Past President of the International College of Surgeons, spoke on the activities of the Journal, and as Chairman of the Publication Committee outlined the progress of the Journal and its constant growth and influence under the able editorship of Dr. Max Thorek.

Prof. Dr. Francisco Martin Lagos, President of the Spanish Section, gave a review of the formation of the Spanish Section and pointed out that the actual

membership is 200. He expressed his extreme satisfaction that thousands of members of the College attended the International Assembly and regretted that several hundred had to be denied admission because of lack of space.

In his address Prof. Dr. Lagos also voiced his regret at the current tendency toward overspecialization and stressed the importance of training general surgeons. He also expressed gratitude to UNESCO for affording scholarships to physicians from various parts of the world who were unable to participate in the lectures and in the Assembly.

Prof. Dr. Alfonso de la Fuente Chaos, Secretary of the Eighth International Assembly Committee, thanked the members for designating Spain as the seat of the Congress and also Prof. Dr. Graña, with whom this suggestion originated.

Prof. de la Fuente's address was brilliant, inspiring and instructive. He particularly stressed the need for cooperation among the surgeons of the world, and both he and Prof. Dr. Lagos expressed their appreciation to Dr. Thorek, the Founder of the College, for his farsightedness in recognizing this need so far in advance and creating the organization that resulted in so much progress and advancement of surgical activity throughout the world.

The Editor-in-Chief of the Journal of the International College of Surgeons reported on the activities of the Journal and its progress. The report has been made part of the Minutes of the meeting.

Resolutions were introduced

1. To augment the number of the Board of Trustees.
2. To create a Liaison Secretary.
3. To elect Regional Secretaries.
4. To amend the Bylaws, Article VIII, referring to Diplomas and reaffirm that no diploma be issued by any section without submitting the applicant in that particular section to rigid evaluation, by merit or by examination of his qualifications; that each section shall issue a certificate to the International College of Surgeons attesting that a particular applicant has been found worthy to become a Diplomate of the International College of Surgeons. Only then shall the International Diploma be issued.
5. To foster postgraduate courses which are being held in many parts of the world, under the auspices of the International College of Surgeons. (This idea was originated and promulgated by Prof. Dr. André Crotti.)
6. To form a Women's Auxiliary in the College.
7. To establish a Founder's Credo which shall become a part of future publications of the College. Dr. Thorek was requested to prepare, as soon as possible, a Credo for the organization he founded, which will then be included in College publications.
8. To create an outline for simplified and uniform Congress procedure. (Introduced by Prof. Edward L. Compere of Chicago, Illinois.)
9. To appoint a consultant to the International Secretariat.

All of these resolutions were properly introduced, seconded and accepted.

A vote of thanks was then recorded for all who participated in the activities of the Congress. A special vote of thanks was extended to Pfizer & Co., who made it possible to present television at this Congress; also, thanks were tendered to the Head of State, the Minister of Education and all the agencies responsible for making this Congress an outstanding success.

New Charters were granted to the Colombian Section, the Pakistan Section, and the Section of Southern Rhodesia, as well as the Netherlands Section. Special thanks were expressed to the officers of the Council for the co-ordination of International Congresses of Medical Sciences for their assistance and cooperation in offering a series of postgraduate lectures in conjunction with the Eighth In-

A glimpse of the international aspect of the meeting in Spain. Left to Right, Mrs. Finsterer, Vienna; Dr. Lyon H. Appleby, Canada; Mrs. Pandalai, India; Dr. W. W. Babcock, and Mrs. Harry E. Bacon, Philadelphia, Pennsylvania.

ternational Congress of the International College of Surgeons and for their granting of six Fellowships to the Congress. The Secretary moved that these resolutions be made part of the record, and this was unanimously carried.

At the final session the Nominating Committee, headed by Prof. Dr. Graña, put in nomination the following officers, who were unanimously elected:

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†Albert A. Berg, A.B., M.D., F.I.C.S., New York, New York

Francisco Grãna, M.D., F.A.C.S., F.I.C.S. (Hon.), Lima, Peru

†Herbert Acuff, M.D., F.A.C.S., F.I.C.S., Knoxville, Tennessee

†Deceased

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Jorge A. Taiana, M.D., F.A.C.S., F.I.C.S. (Hon.), Buenos Aires, Argentina
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Francisco Martín Lagos, F.I.C.S. (Hon.), Madrid, Spain

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Jacob Bitschai, M.D., F.I.C.S., Alexandria, Egypt

Prof. Dr. A. de la Fuente Chaos delivering the closing address of the Congress.

ASIA—Far East

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William Carpenter MacCarty, Sr., M.D., F.A.C.P., F.I.C.S. (Hon.), Rochester, Minnesota

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Fahri Arel, M.D., F.I.C.S., Istanbul, Turkey

Charles H. Arnold, M.D., F.I.C.S., Lincoln, Nebraska

Antonio C. Vicente Azevedo, M.D., F.B.C.S., F.I.C.S., Sao Paulo, Brazil

William Wayne Babcock, M.D., F.A.C.S., F.I.C.S. (Hon.), Philadelphia, Pennsylvania

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Raffaele Bastianelli, M.D., F.A.C.P., F.I.C.S. (Hon.), Rome, Italy

Julio Baistrocchi, M.D., F.I.C.S., Cordoba, Argentina

Moses Behrend, M.D., F.A.C.S., F.I.C.S., Philadelphia, Pennsylvania

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Alfredo Borjas, M.D., F.A.C.S., F.I.C.S., Caracas, Venezuela

The Eighteenth Annual Congress

of the

United States and Canadian Sections

International College of Surgeons

will be held at the

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Francisco Fonseca Garcia, M.D., F.I.C.S., Mexico City, Mexico
Rudolfo de Freitas, M.D., F.B.C.S., F.I.C.S., São Paulo, Brazil
Oscar Cintra Gordinho, M.D., F.B.C.S., F.I.C.S., São Paulo, Brazil
Roberto Goyenechea, M.D., F.I.C.S., Buenos Aires, Argentina
Francisco Graña, M.D., F.A.C.S., F.I.C.S. (Hon.), Lima, Peru
Elmer Henderson, M.D., F.A.C.S., F.I.C.S., Louisville, Kentucky
Elmer Hess, M.D., F.A.C.S., F.I.C.S., Erie, Pennsylvania
N. Frederick Hicken, M.D., F.A.C.S., F.I.C.S., Salt Lake City, Utah
Arthur Hübner, M.D., F.I.C.S., Berlin, Germany
Oscar Ivanissevich, M.D., F.A.C.S., F.I.C.S. (Hon.), Buenos Aires, Argentina
Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S., Madison, Wisconsin
K. E. Kallio, M.D., F.I.C.S., Helsinki, Finland
Henry H. Kessler, M.D., F.A.C.S., F.I.C.S., Newark, New Jersey
G. E. Konjetzny, M.D., F.I.C.S. (Master), Hamburg, Germany
Francis L. Lederer, F.A.C.S., F.I.C.S. (Hon.), Chicago, Illinois

Interested attendants at the Eighth International Congress. Left to right, Prof. de la Fuente Chaos, Prof. Martin Lagos, Mrs. Fishbein.

Lucien Leger, M.D., F.I.C.S., Paris, France
J. Heng Liu, M.D., F.I.C.S., Taiwan, Formosa
William Randolph Lovelace, M.D., D.A.B., F.I.C.S., Albuquerque, New Mexico
George F. Lull, M.D., D.P.H., M.P.H., F.A.C.S., F.I.C.S. (Hon.), Chicago, Illinois
Fernando Luz, Filho, M.D., F.I.C.S., Salvador, Bahia, Brazil
Douglas Urquhart MacGregor, M.D., F.I.C.S., Hamilton, Ontario, Canada
Lucas Monteiro Machado, M.D., F.B.C.S., F.I.C.S., Belo Horizonte, Brazil
Dervis Manizade, M.D., F.I.C.S., Istanbul, Turkey
Dr. Clement L. Martin, F.A.C.S., F.I.C.S., Chicago, Illinois
José de Andrade Medicis, M.D., F.B.C.S., F.I.C.S., Recife, Brazil
Vasant P. Mehta, M.D., F.C.P.S., F.I.C.S., Bombay, India
Harry J. Oberhelman, M.D., F.A.C.S., F.I.C.S., Chicago, Illinois
José Ortiz Cespedes, M.D., F.I.C.S., San José, Costa Rica
Neal Owens, M.D., F.A.C.S., F.I.C.S., New Orleans, Louisiana
Lt. Col. K. G. Pandalai, F.R.C.S. (Eng.), F.I.C.S., I.M.S. (Ret'd.), Madras, India
Cesar A. Pantoja, M. D., F.I.C.S., Bogotá, Colombia
Esteban Paulín, M.D., F.I.C.S., Queretaro, Qro., Mexico
Georges Portmann, M.D., F.I.C.S. (Hon.), Bordeaux, France
Gen. Emanuel Marques Porto, M.D., F.B.C.S., F.I.C.S., Rio de Janeiro, Brazil
Jacob G. Probstein, M.D., F.A.C.S., F.I.C.S., St. Louis, Missouri
Antonio Puigvert Gorro, M.D., F.I.C.S., Barcelona, Spain
B. N. Balkrishna Rao, B.Sc., M.B., F.A.C.S., F.R.C.S. (Eng.), F.I.C.S., Gwalior, C. I.
Esteban Rocca, M.D., F.I.C.S., Lima, Peru
Benjamin de Rocha Sales, M.D., F.B.C.S., F.I.C.S., Salvador, Bahia, Brazil
I. R. Rosin, M.B., M.D., F.R.C.S. (Edin), F.I.C.S., Salisbury, Southern Rhodesia
Leopold Schönbauer, M.D., F.I.C.S., Vienna, Austria
Higoshige Shiota, M.D., F.I.C.S. (Hon.), Tokyo, Japan
Enrique St. Loup B., B.Sc., M.D., F.A.C.S., F.I.C.S., La Paz, Bolivia
Stefano Teneff, M.D., F.I.C.S., Torino, Italy
Georg Wolfsohn, M.D., F.I.C.S., Jerusalem, Israel
Augusto Wybert, M.D., F.I.C.S., Buenos Aires, Argentina
Bernhard Zondek, M.D., F.I.C.S. (Hon.), Jerusalem, Israel

The installation of the new officers then proceeded, and Prof. Dr. Graña presented Prof. Dr. Hans Finsterer the gavel of office, with appropriate comments. Prof. Dr. Finsterer responded with a gracious and eloquent acceptance. Prof. Dr. Rudolph Nissen, President-Elect, spoke warmly in acceptance of the office.

Prof. Dr. Finsterer than appointed the following Committees:

International Executive Council
Prof. Dr. Hans Finsterer
Prof. Dr. Rudolph Nissen
Prof. Dr. Max Thorek
Dr. James T. Case

As per Section 4, Article VII, Page 32, Constitution. 4 members from Board of Trustees to be appointed as follows:
Dr. Henry W. Meyerding
Dr. George Lull
Dr. William Carpenter MacCarty, Sr.
Dr. Moses Behrend

Home Management Committee
(International Representatives)
Dr. Karl Meyer
Dr. Max Thorek

Auditing Committee
Dr. James T. Case, Treasurer
Prof. Dr. Rudolph Nissen
Dr. José Avelino Chaves

Committee for Museum of History of Surgery
Entire Board of Trustees

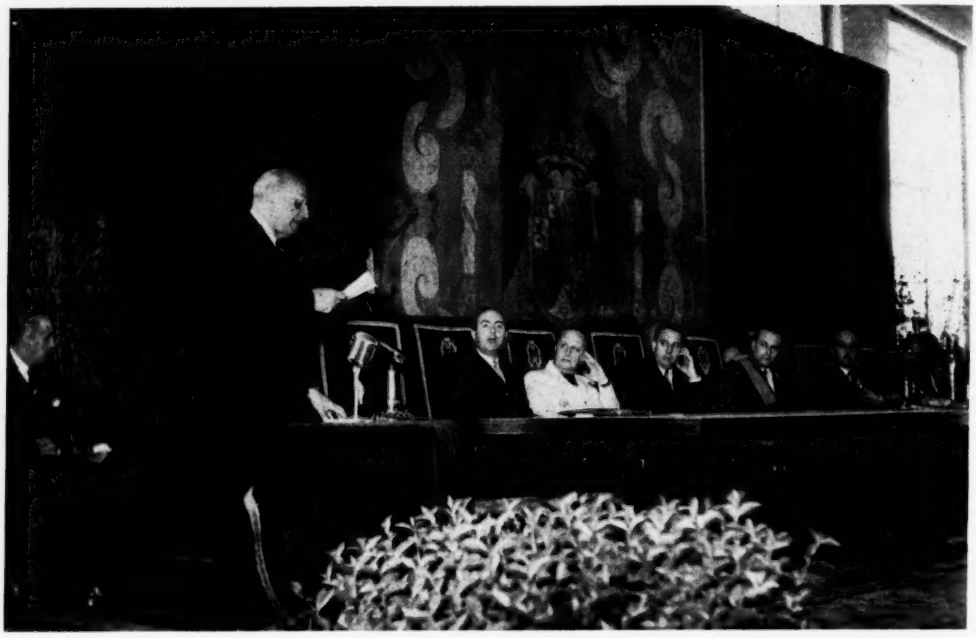
Publications Committee
Prof. Dr. Francisco Graña, Chairman
Prof. Dr. Rudolph Nissen
Dr. Henry W. Meyerding
Dr. Max Thorek
Dr. Arnold Jackson
Dr. Edward Compere

Committee on European Affairs
Dr. Rudolph Nissen, Chairman

International Academic Committee for Postgraduate Courses
Dr. André Crotti, Chairman, Columbus, Ohio
Prof. Dr. Albert Lezius, Hamburg, Germany
Prof. Dr. Felix Mandl, Vienna, Austria
Prof. Rudolfo de Freitas, São Paulo, Brazil
Prof. Hiroshige Shiota, Tokyo, Japan
Mr. Lawrence Abel, London, England
Prof. P. T. Crymble, Belfast, Ireland
Prof. Dr. Lucian Leger, Paris, France
Prof. Dr. Jorge A. Taiana, Buenos Aires, Argentina
Prof. Dr. José Soler-Roig, Barcelona, Spain

Organizing Committee for the Ninth International Congress in Sao Paulo, Brazil
Carlos Gama, Chairman
José Avelino Chaves
Oscar Cintra Gordinho
Eurico Branco Ribeiro
Rodolpho de Freitas
A. C. Vicente Azevedo
Emanuel Marques Porto
Lucas M. Machado
José Medicis
Fernando Luz, Filho
Benjamin Rocha Sales
Elpidio V. Cannabrava
Pedro Falcao
J. M. Cabello Campos

Scientific Program: The scientific sessions, which were remarkable for their unusually high level of sustained interest and their immense professional value, were classified as to subject matter into seven principal categories: (1) General



Scene at closing session of the Congress, attended by the Chief of State, Ministers of Education and Officers of Spanish Section.

Surgery; (2) Surgery of the Digestive Tract; (3) Traumatology and Orthopedics; (4) Neurosurgery, Otorinolaryngology, Ophthalmology and Pathology; (5) Urology; (6) Obstetrics, Gynecology, Anesthesia and Radiology, and (7) Thoracic and Cardiovascular Surgery. A great number of surgeons from the United States contributed original presentations. As many as possible of the Madrid papers now available appear in this issue of the Journal, and others will appear in successive issues. The mass of material presented, covering as it does every phase of surgical practice and enunciated by so many of the world's most distinguished surgeons, constitutes a body of knowledge beyond the usual and a contribution to the literature that the Journal is proud to make.

Operative Clinics: Operative clinics were held at the Hospitales de San Carlos, General, de la Cruz Roja, and de la Princessa y Carabanchel. Televised operations (see editorial, Page 615) were shown at the Instituto Nacional de Medicine y Seguridad del Trabajo.

Special Sessions: In addition to the program of original presentations and the operative clinics, four lecture and conference sessions were held at the Instituto de Medecina y Seguridad del Trabajo. The first, on May 20, had as its subject "Surgical Treatment of Vesical Tumors" and was headed by Prof. Raymond Darget of the University of Bordeaux, Prof. Boeminghaus of the University of Düsseldorf, Prof. R. de Freitas of the University of San Pablo, Brazil; Prof. Gil Vernet of the University of Barcelona. Dr. O. S. Lowsley of New York and Dr. M. K. O'Heeron of Texas also participated. The second, "Surgery of the Hip", was held on May 21, with Mr. H. S. Brittain of Norwich, England, Prof. Dr. R. Judet of Paris, Dr. T. Rodriguez de Mata

of Madrid, Dr. Roger Anderson of Seattle, Washington, Dr. E. L. Compere of Washington, D. C., and Prof. Dr. B. Salles of Brazil.

On May 23 the subject under discussion was "Surgery of Rectal Tumors" and the speakers were Prof. Dr. Hellner of Göttingen, Dr. W. W. Babcock of Philadelphia, Dr. Pi Figueras of Barcelona, Mr. A. Lawrence Abel of London, Dr. Vergara Soto of Mexico, D. F., and Dr. Harry E. Bacon of Philadelphia. The final discussion, held on May 24, was on "Cardiovascular Surgery", the speakers being Prof. Dr. P. Valdoni of the University of Rome, Prof. Dr. Derra of the University of Düsseldorf, Prof. C. H. Bailey of Philadelphia, Prof. G. H. Pratt of New York, Prof. Dr. J. Taiana of Buenos Aires and Prof. Dr. P. Piulachs of the University of Barcelona.

Exposition: A number of striking and highly impressive exhibits were provided, including displays of original paintings; materia chirurgica; plans of surgical residences; laboratory material; general scientific material, and medical books and periodicals. In the Instituto Nacional de Medecina y Seguridad del Trabajo, Medals of Honor were awarded to Dr. Corra (for oils) and, in gold, to Drs. Anduiza and Morales D'az (for water colors) in the Art Competition, the awards being made by the Organizing Committee of the Eighth International Congress. This committee was headed by Prof. Dr. Martin Lagos, president; Prof. Dr. Garcia Orcoyen, vice-president, and Prof. Dr. A. de la Fuente Chaos, Secretary-General and Vice-President of Sections. Prof. de la Fuente praised the spirit of cooperation in the contest and in the scientific as well as the artistic exposition, mentioning collaborations that aroused great interest and enthusiasm. He terminated his talk by praising the Spanish manufacturers of clinical and pharmaceutical products, whose exhibits added so much to the brilliance of the Exposition.

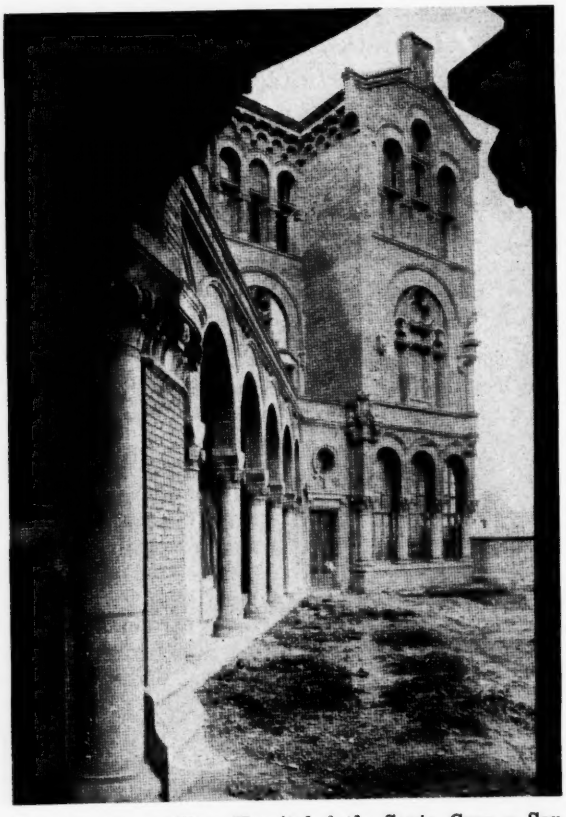
In the scientific expositions a medal was awarded for the stand presented by Dr. Skevos Zervos, professor of the History of Medicine at the University of Athens. A gold medal was presented to the American General Hall for efficient evacuation of the wounded from the battlefield, and silver medals were awarded to Drs. Inglesias, de la Pena and de la Fuente. Gold and silver medals were also presented to outstanding industrial exhibits, these being the Laboratories Reunidos and the Compania de Penicilina, Antibioticos, Panquimica y Abello, respectively. The awards were made in the Central Pavilion of the Faculty of Medicine.

It was most interesting to note that over five hundred oil paintings, water colors, and sketches were entered in the Art Contest, proving once for all that a surgeon need not *always* stick to his scalpel!

Social Events: Spain is historically famous for the magnificence of its hospitality, and any who attended the Eighth International Congress in Madrid can attest that this distinction is a true one. Nothing was left undone that could conceivably have added to the comfort or pleasure of the surgeons and the surgeons' wives who attended. An official dinner of welcome was given by the Spanish Section in honor of the delegates on the evening of May 19, and on May 20 a cocktail party was given by the Organizing Committee in the Faculty of Medicine. On May 21 a special reception was held for the ladies by the official government of the city of Madrid. Other unforgettable social and sightseeing privileges were afforded by an excursion to Toledo, city of great antiquity and romance dating back to the fifth century A.D.; by a tour of the Museo del Prado, and by a typical Spanish fiesta at Castillo Higares. A festival bullfight in the Plaza de Toros was an additional feature.

Throughout the time so delightfully spent in Madrid, all guests were keenly conscious of the warmth, friendliness and generosity of their hosts. The fabulous scenic appeal of Spain and the aura of

history that hovers almost visibly over its landscapes and its ancient buildings and gardens combine to fill the visitor's mind with wonder and enjoyment. It is safe to say that occasion of the Eighth International Congress in Madrid will linger long in the memories of those who had the great privilege of attending.



Convalescent pavilion, Hospital de la Santa Cruz y San Pablo, Barcelona.

Reunion in Barcelona

Spanish Section, International College of Surgeons

MAY 16 AND 17, 1952

Meeting in Barcelona on Friday and Saturday, May 16 and 17, 1952, the delegates and guests of Eighth International Congress were given a superb opportunity to approach the Congress in Madrid with even greater interest and enthusiasm than usual, for a visit to the ancient city of Barcelona and the privilege of attending surgical clinics in its fine hospitals was memorable indeed. Clinics were held in the Hospital de la Cruz y San Pablo (a magnificent institution, of which more details will be given later), the Hospital Clinico, the Instituto Neurologico Municipal, the Hospital Sagrado Corazon, the Clinica Particular Dr. H. Arruga, the Instituto Oftalmologico Dr. Barraquer, the Hospital de la Cruz Roja, and the Maternidad Provincial. As many of the clinics were held simultaneously in the morning hours, it was impossible for every guest to attend them all, but each had an opportunity to visit those connected with his special interests.

Scientific Program First Day: At 9 a.m., at the Hospital de la Santa Cruz y San Pablo, in the orthopedic surgical service of Prof. Dr. Vilardell, the topics were Pott's disease, with the use of vertebral osteoperiosteal grafts, and tuberculosis of the hip with iliotrochanteric arthrodesis. At 11 a.m. a conference was held, at which Dr. Henry W. Meyerding of Rochester, Minnesota, spoke on spondylolisthesis. At the same hospital, in the general surgical service of Prof. J. Pi-Figueras, the themes for the 9 a.m. clinic were anastomotic ulcer, cholecystectomy and essential hypertension. In the traumatic surgical service (Prof. Bosch Avilés) the pinning of a hip fracture was demonstrated. Profs. Rosal and Cornudella held a clinic on thoracic operations. At 11 a.m., in the service of digestive diseases (Prof. A. T. Pinós), Dr. Harry E. Bacon of Philadelphia spoke on ulcerative colitis. In the hospital auditorium at the same hour, Prof. Pi Figueras presided over a conference in which Dr. Lyon Appleby of Canada discussed cystic intestinal pneumatosis.

The 9 a.m. clinics at the Hospital Clinico were as follows: surgical service of Prof. Dr. P. Piulachs, duodenal ulcer, goiter, sympathectomy, and hemodyalysis in the artificial kidney (Dr. L. Bartrina); neurosurgical service of Prof. A. Ley, cerebral tumor; gynecologic service of Prof. Dr. V. Canill, numerous gynecologic operations; ophthalmologic service of Prof. Dr. M. Soria, surgery of the eye; service of Prof. Dr. Carulla, gastric carcinoma (Prof. Dr. J. Usua). Eleven o'clock conferences at the same hospital were headed by Dr. Moses Behrend of Philadelphia and Dr. Roland Klemme of St. Louis, Dr. Behrend speaking on op-

Prof. Dr. José Soler-Roig.

Reception committee showing delegates and guests of the Reunion the places of special interest in Barcelona.

erative indications in the presence of acute cholecystitis and Dr. Klemme on the surgical treatment of Parkinson's syndrome. Dr. Klemme made his presentation in Spanish and showed illustrative films.

At the Instituto Neurologico Municipal the neurosurgical service (Prof. Dr. Tolosa) held a clinic on tumors of the brain, and the otolaryngologic service (Prof. Dr. A. Azoy) a clinic on one-stage operation for pansinusitis. The Hospital Sagrado Corazon offered clinics in the orthopedic surgical service of Prof. Dr. A. S. Palazzi and the gastroenterologic department of Prof. Dr. D. Moxó. The topics at the former clinic were acrylic arthroplasty of the hip. Venable-Stuck's hip operation, and Vulpius-Strayers' procedure for the spastic patient. The subject of the gastroenterologic clinic was duodenal ulcer (Prof. Dr. Agusti).

The only afternoon session was held at the private clinic of Prof. Dr. H. Arruga and was devoted to surgery of the eye.

Scientific Program, Second Day: On Saturday May 17 the Hospital de la Cruz y San Pablo afforded opportunity to visit the following clinics: surgical service of Prof. Dr. Soler-Roig, duodenal ulcer, anastomotic ulcer, carcinoma of the rectum, and hydatid cyst of the liver perforating into the bile ducts; surgical service of Prof. Dr. Prim, dolichosigmoid resection and duodenal ulcer; urology service of Prof. Dr. Puigvert, total perineal cystectomy, transperineal resection of the prostate, and nephrectomy; orthopedic service of Prof. Dr. Vilardell, spinal fusion for lumbosacral sciatica, the Delageniere-Vilardell osteoperiosteal graft, and Brittain's scapulohumeral arthrodesis. On the same morning at the Hospital Clinico the surgical service of Dr Piulachs held clinics on lumbar ganglio nectomy and splanchnicectomy, the oper ative treatment of varicose veins in th leg (Prof. Dr. Vidal Barraquer) and ski

grafting (Prof. Dr. Mir). In the gynecologic service at the same hospital Prof. Dr. Conill discussed gynecologic surgical procedures, and in the neurologic service Prof. Dr. A. Ley presented neurosurgical technics. In the service of ophthalmology, Prof. Dr. Soria continued his discussion of surgery of the eye.

The Instituto Neurologico Municipal opened the second day of the meeting with the following clinics: neurosurgical service (Prof. Dr. Tolosa), trigeminal neuralgia; otolaryngologic service (Prof. Dr. A. Azoy) a repetition of the first' days clinic on pansinusitis, to permit more visitors to attend. At. Prof. Dr. Barraquer's ophthalmologic clinic, surgical technics for that specialty were presented. The Hospital de la Cruz Roja contributed a clinic on General surgery in the service of Prof. J. Garcia Tornel, and the Maternidad Provincial a clinic on gynecologic operations under the direction of Prof. Dr. S. Dexeus.

All of these presentations were highly profitable to those who attended them, and the warmest thanks are due to the various hospitals and services.

Special appreciation is due also to Prof. Dr. José Soler-Roig of Barcelona, whose dynamic leadership and steadfast devotion to the interests of the College bore a large part in making the Barcelona meeting the unforgettable occasion it was, from both the scientific and the social standpoint. Both he and Mrs. Soler-Roig ministered constantly to the comfort and entertainment of those who attended the meeting. Prof. Soler-Roig's surgical clinics were classics in their field, displaying extraordinary profundity and skill.

The afternoons of the two days were spent in social activities and sightseeing, the latter including a tour of the beautiful Hospital de la Cruz y San Pablo. This institution, one of the most venerable as well as one of the most impressive in the world, combines the mellow

Reception in Barcelona. Left to right, Mrs. Carlos Gama; Prof. Dr. Soler-Roig; Mrs. Henry W. Meyerding; Dr. Morris Fishbein; Mrs. W. Wayne Babcock; Dr. Arnold S. Jackson; Mrs. Fishbein.

beauty of old Spain with a highly contemporary awareness of today's needs. Its origin dates back to 1401. Actually it is almost a group of hospitals in one immense unit, separate buildings called "pavilions" being assigned to surgery, gynecology, medicine, tuberculosis, mental infirmities, pediatrics, traumatology, etc. The architecture here is "frozen music" indeed; the finely proportioned rooms and corridors, the majestic arches and the vistas through the high arched windows cannot be forgotten, once seen. The spaciousness within is another revelation, almost as striking in these crowded days as the exquisite stone-carving that appears everywhere. This, no doubt, the Hospital owes to its great age. Even the rooms that serve as wards seem palatial, and the restrained richness of the decor in general must be a welcome aid to hospitalized patients.

At the conclusion of the 11 a.m. clinics on Friday, a reception was given by the Faculty of Medicine, whose headquarters is near the Hospital Clinico, as a welcome to the guests and a keynote for the abundant hospitality planned for Saturday. This began at noon with a visit to the Muy Ilustre Diputacion Provincial of Barcelona. At 1 p.m. a reception with cocktails, was given by the Mayor of Barcelona in the Ayuntamiento (Town Hall). At 6 p.m. a special bullfight was staged in honor of the International College of Surgeons, with a display of bullfighting on horse back. The great day ended with a gala *al fresco* banquet at El Cortijo.

Thus closed two wonderful days in Barcelona. Both delegates and guests expressed the utmost delight in the experience; old friendships were renewed, new friendships formed, and a strong, sure impetus given toward perpetual cooperation of surgeons from different lands.

The bow cannot always stand bent, nor can human frailty subsist without some lawful recreation.

Make it thy business to know thyself, which is the most difficult lesson in the world.

Now blessings light on him that first invented sleep! It covers a man all over, thoughts and all, like a cloak; 'tis meat for the hungry, drink for the thirsty, heat for the cold, and cold for the hot. 'Tis the current coin that purchases all the pleasure of the world cheap; and the balance that sets the king and the shepherd, the fool and the wise man even.

—*Cervantes*

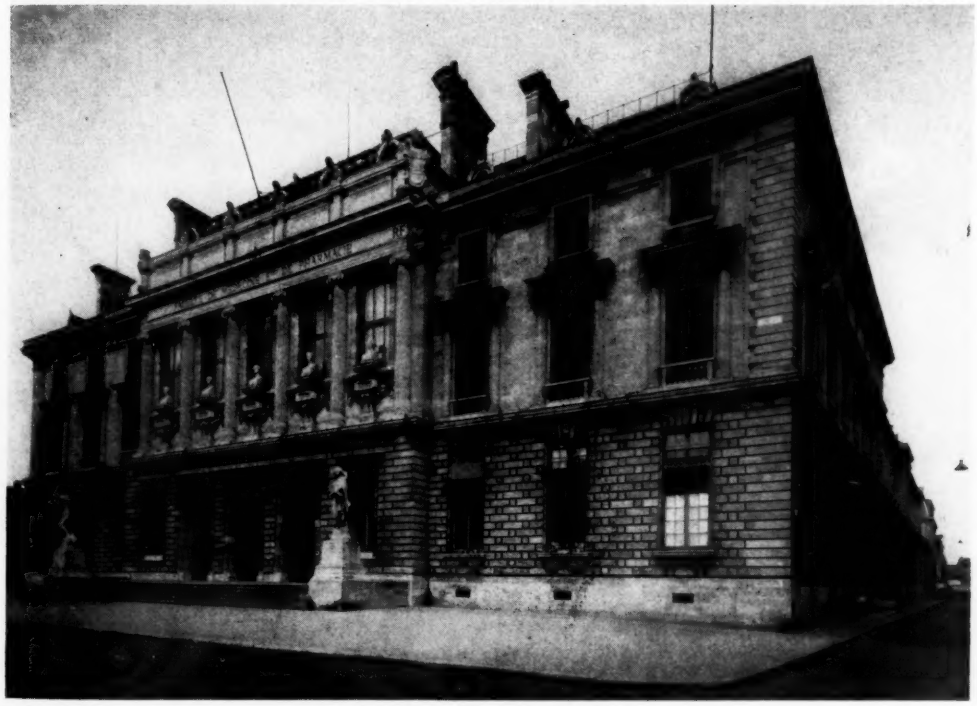
Reunion in Bordeaux

French Section, International College of Surgeons

MAY 13-15, INCLUSIVE, 1952

THE Bordeaux meeting afforded not only another outstanding scientific and social experience but an opportunity to see and applaude the remarkable progress made by the French Section of the College in the short time that has elapsed since its organization. Here too the immemorial European cultural tradition formed a brilliant backdrop to the scene of scientific effort and achievement in modern France. Guests and delegates were welcomed to the city by M. Chaban-Delmas, Deputy Mayor of Bordeaux, and his municipal council, by a delightful reception at the Hôtel de Ville.

The scientific sessions were held at the Faculté de Médecine, an institution with a long and interesting history, which may be briefly summed up here: According to the oldest document in existence on Bordelaise medicine, bearing the date of 1411, an institution known as the College of Physicians in the City of Bordeaux was founded at that time. In June 1411 the first meeting was held in the presence of the Mayor and the municipal council. The new institution showed a steady growth. In the sixteenth century its leaders recognized the need for some supervision and regulation of medical and surgical practice and set up probationary examinations for young practitioners. In November 1636, in imitation of the Faculté de Paris, it became obligatory for doctors to pre-



The Faculty of Medicine at Bordeaux, where the French Section of the International College of Surgeons held its reunion.

M. André Marie, Minister of Education of the French Government, arriving from Paris to attend the meeting of the French Section of the International College of Surgeons in Bordeaux.

Group of those attending the Congress during a recess of the meeting of the French Section.

Prof. Dr. Raymond Darget, President of the French Section, delivering the opening address.

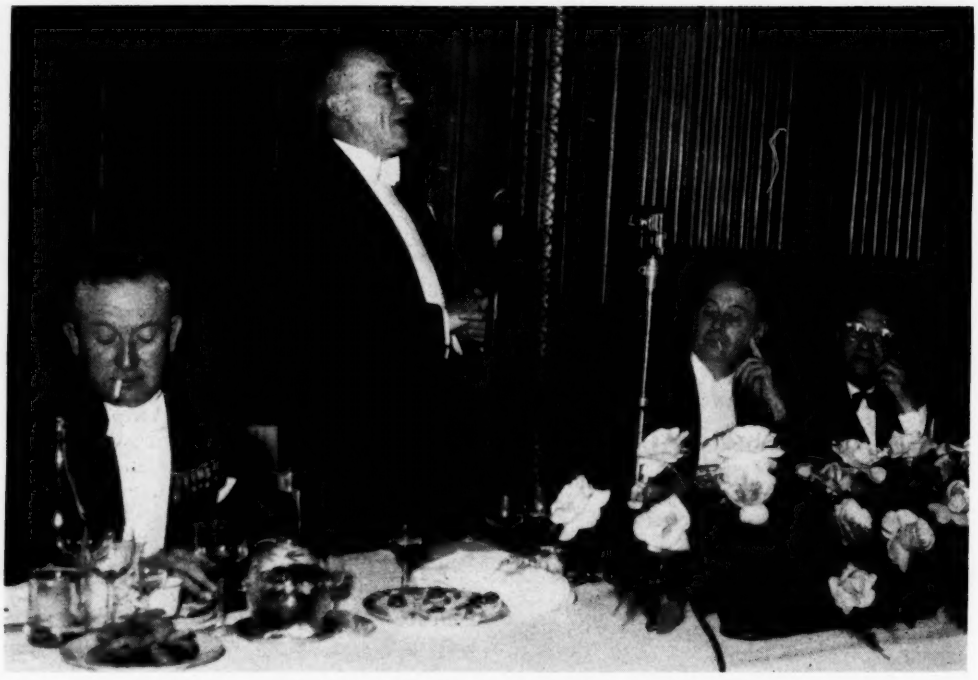
sent these publicly at the Hôtel de Ville after two years of service in the hospitals. On November 24, 1707, Louis XIV appointed five physicians to give free consultation and treatment to the poor of the city. In 1721, the College received personal felicitations from Louis XV for medical services rendered him by one of its members. The growth of the College continued, and it was eventually necessary to create separate chairs of medicine and surgery; but the period of growth was not without complications. For many years there were frequent conflicts between the Faculté de Médecine, consisting of two professors, and the College des Medicins, to which all practitioners belonged. L'Ecole de Médecine de Bordeaux was founded on February 20, 1793, by Moulinié. On March 26, 1829, it adopted the name 'Ecole de Médecine et de Pharmacie de Bordeaux. It was not until December 1874 that the Faculté Mixte de Médecine et de Pharmacie was established, with Dr. H. Gintrac as its first dean. The inauguration ceremonies were performed on April 28, 1888, in the presence of the President of the Republic.

Scientific Session: Officers of the French Section—Prof. Dr. Raymond Darget, President; Prof. Drs. Jean Creyssel and Marc Iselin, Vice-Presidents; Prof. Dr. Georges Dubourg, Secretary, and Prof. Dr. LaChapele, treasurer — expressed great pleasure that a reunion with the delegates from the United States and other Sections was made possible by the happy juxtaposition of the time selected for the French Section Reunion and the Eighth International Congress. The scientific presentations, which included operative clinics, special conferences and technical motion pictures (many in color), were divided into eight general heads and

committees assigned to them as follows: General Surgery, Prof. Drs. André Ameline, Fernand Carcassonne, Jean Creysell, Marc Iselin, Lucien Leger, Joseph Magendie and Charles Mirallie; Thoracic Surgery, Prof. Drs. Robert de Vernejoul and Georges Dubourg; Urologic Surgery, Prof. Drs. Emile Chauvin and Pierre Fabre; Otorhinolaryngologic Surgery, Prof. Drs. Georges Portmann and Maurice Sourdille; Ophthalmology, Prof. Drs. Edmond Velter and Joseph Beaudieux; Neurosurgery, Prof. Dr. Guy Lazorthes; Surgery of Carcinoma, Prof. Dr. Joseph Bouvier, and Anesthesiology, Prof. Dr. Marcel Thalheimer. That these committees did their work extremely well was testified by the high level of the communications presented.

The United States surgeons who appeared on the Bordeaux program were Dr. Henry W. Meyerding of Rochester, Minnesota; Dr. E. L. Compere, of Chicago; Dr. Anthony J. Mendillo, of New Haven, Connecticut; Dr. J. S. Probstein, of St. Louis; Dr. W. W. Babcock, of Philadelphia; Dr. Otis R. Wolfe, of Marshalltown, Iowa; Dr. Vincent P. Mazzola, of Brooklyn; Dr. Harvey E. Billig, of Los Angeles; Dr. Roland Klemme, of St. Louis; Dr. Harry E. Bacon, of Philadelphia; Dr. O. C. Foster, of Detroit; Dr. U. G. Dailey, of Chicago; Dr. Warren L. Rosen, of New Orleans; Dr. J. C. Alexander of Dallas; Dr. M. R. Brodny, of Boston; Dr. M. K. O'Heeron, of Houston, Texas; Dr. Arnold S. Jackson, of Madison, Wisconsin; Dr. Pratt, of New York; Dr. S. O. Moseley, of Selma, Alabama; Dr. R. W. Barnes, of Los Angeles; Dr. K. L. McShane of Cheyenne; Dr. A. M. Hansen, of Los Angeles; and Drs. F. B. Campbell and Samson of St. Louis. Many of their fine contributions appear in this issue. Canada was represented by Dr. Lyon H. Appleby and others.

The operative clinics, a prominent and



M. André Marie, Minister of Education, addressing the Bordeaux meeting.

Dr. Henry W. Meyerding addressing the French Section of the International College of Surgeons at the reunion in Bordeaux.

impressive feature of the program, were held at seven scientific institutions of Bordeaux; the Hôpital Saint-André, the Hôpital du Tondu, the Hôpital des Enfants, the Foundation Bergonte, the Clinique Pasteur, the Clinique Tourny, and the Clinique Bagatelle, as follows:

Hôpital Saint-André (Hospital of St. Andrew), clinical and surgical service of Prof. Dr. Papin: Ileoconic Prethoracic Esophagoplasty, by Prof. Dr. Papin; Right Pneumonectomy for Neoplastic disease or Segmental Resection for Bacillosis; Prethoracic Esophagoplasty, by Prof. Drs. Laffargue and Dufourt, and Medullo-adrenalectomy, by Prof. Dr. Darmaillacq.

Hôpital du Tondu: Transmaxillofacial Procedure for Neoplasm of the Maxilla, by Prof. Dr. Portmann; by Prof. Dr. Darget, Ureterointestinal Anastomosis; Section of the nervi erigenti as a Life-Saving Measure, and Operative Complications in Neoplasms of the Bladder.

Hôpital des Enfants (Children's Hospital): Orthopedic Procedures, by Prof. Dr. Pouyanne.

Foundation Bergonie: Carcinoma of the Male Genitalia, Carcinoma of the Breast, and Carcinoma of the Tongue, all by Prof. Drs. Auché and LaPorte.

Clinique Pasteur: Transthoracic Esophagectomy, by Prof. Dr. Dubourg.

Clinique Tourny: Nasal Plastic Procedure, by Prof. Dr. Goumain.

Clinique Bagatelle: Operative Session Conducted by Prof. Dr. Villar.

Twenty-four surgical films were presented by European and American surgeons, covering an immense range of surgical interest. The papers presented in various fields of surgery numbered almost a hundred; we regret that space does not permit us to publish the authors and titles.

Scene at ladies' reception in honor of the National Minister of Education from Paris (M. Marie) headed by Mme. Darget of Bordeaux.

M. Chaban-Delmas, Deputy Mayor of Bordeaux, and Dr. Thorek during the reception given by the French Section at Bordeaux.

In addition to these fine presentations, the surgical films and the operative clinics, special conferences were held by Prof. Drs. Creyssel, Guiheneuc, Leger, Mirallie, Iselin, Ameline, Carcassonne and Cahen in various fields of special surgical interest.

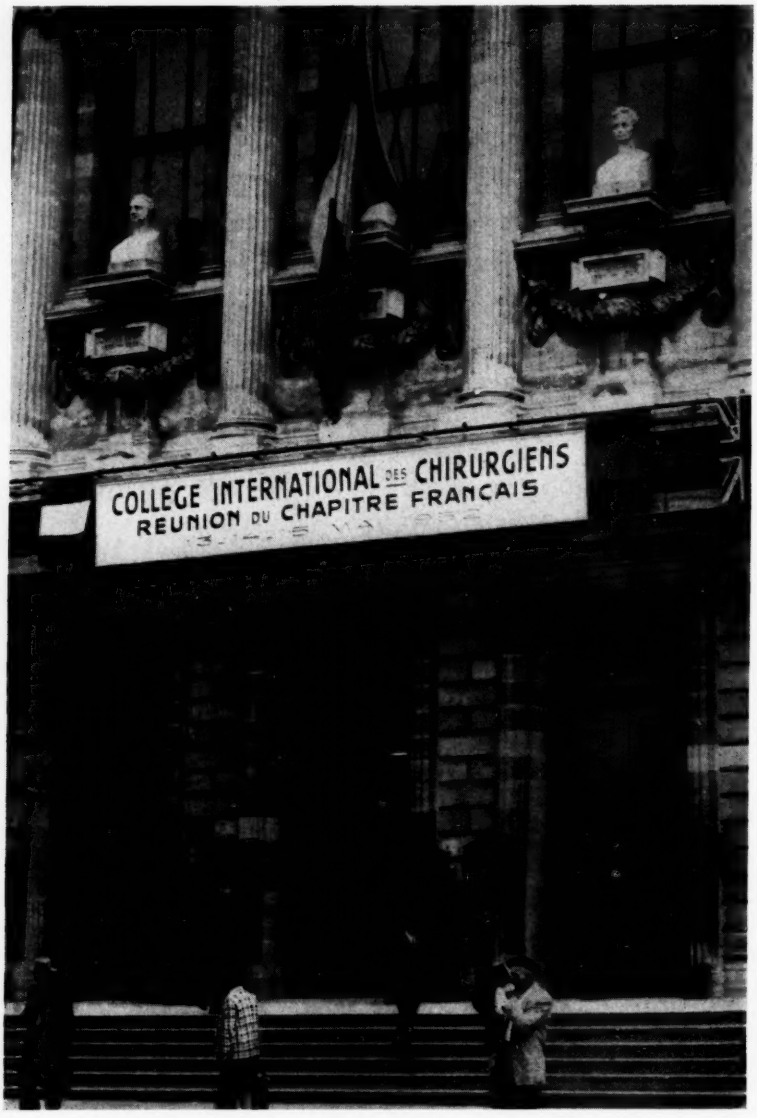
Social and General Activities: The first day in Bordeaux was made memorable by the Mayor's reception already mentioned, by a tea at I' Hôtel Splendide and by a gala soirée at the Grand Theatre, with a most enjoyable ballet. On the second day of a tour of the city was made; a cocktail party in honor of the Reunion was given at the Chamber of Commerce headquarters; an afternoon excursion to the Chateau Margaux, followed by tea, was added to the festivities, and the grand climax was reached at a banquet in the foyer of the Grand-Théâtre. A ladies' reception was given in honor of M. André Marie, national Minister of Education, who was present and addressed the meeting.

During the visit to Bordeaux, the Ecole de Médecine Navale et Coloniale (School of Naval and Colonial Medicine) was visited by a large group of surgeons who were greatly impressed by the capacious amphitheatres, the modernism of the well-ventilated dissecting rooms, the laboratory equipment and the number and size of the associated hospitals. This school, founded in 1890, is associated with the University of Bordeaux and is provided for the education of medical men and pharmacists who desire qualification for naval and colonial service. Special attention is paid to the pathology

and therapy of tropical diseases. Since 1950 the school has recruited candidates for the medical and pharmaceutical services of the Air Force as well as the Navy. Students are selected by an annual examination; medical candidates must show graduate credentials in physics, chemistry and biology, and pharmaceutical candidates in general pharmacy. The applicants come from various civil medical schools and from the associated Schools of Naval Medicine in Brest, Toulon and Rochefort. In the associated schools they remain civilians, but after admittance at Bordeaux they live under a military regime and are required, after they have passed their tests for physical fitness, to sign a pledge committing them to six years' service in the Marine Corps, the Air Force or the Colonial forces after graduation. On graduation they are given the rank of lieutenants and embark for duty, some to Africa, some to Madagascar, some to Tonkin, etc. Many of these well-trained graduates have made extremely valuable contributions to our knowledge of tropical diseases.

Bordeaux itself, an intrinsically interesting and even fascinating city, will be cherished more warmly than ever by those who shared this latest experience of its charm. Nowhere was enjoyment more manifest or hospitality more gracious and courteous, and never was any hospitality and courtesy more deeply valued. We congratulate the French Section also on the amazing scientific and organizational progress it has made in the very short period that has elapsed since it

Another group in attendance. Left to right, the Prefect of the City, Dr. Jackson, Prof. Darget, Dr. Meyerding, and M. Chaban-Delmas, Mayor of Bordeaux.



Another view of the Bordeaux Faculty of Medicine.

was founded. The International College of Surgeons is no stranger to this zealous type of growth, which springs naturally, we think, from the vitality and dynamism of the ideals on which the College was originally founded. We could ask no

better demonstration of the soundness and strength of these ideals than was afforded by the Reunion at Bordeaux, nor could we have found a pleasanter or a more lasting addition to the treasure trove of memory and friendship.

Temperance and industry are man's true remedies; work sharpens his appetite and temperance teaches him to control it.

—*Rousseau*

Liberty of thought is the life of the soul.

—*Voltaire*

Philosophy triumphs easily over past evils and future evils; but present evils triumph over it.

—*La Rochefoucald*

We are born to inquire after truth; it belongs to a greater power to possess it. It is not, as Democritus said, hid in the bottom of the deeps, but rather elevated to an infinite height in the divine knowledge.

—*Montaigne*

By labor Wisdom gives poignancy to pleasure, and by pleasure she restores vigor to labor.

—*Fénelon*

I have examined whether there were no way to succeed without worth, and I have found none.

—*Vauvenargues*

The storms and sufferings of the higher spheres of human existence are appreciated only by the lofty spirits who inhabit these. In all things we can be judged properly only by our equals.

—*Balzac*

Instinct needs to be trained by method; but instinct alone helps us to discover a method which will suit us, and thanks to which our instinct can be trained.

—*Cocteau*

Reunion in Vienna

Austrian Section, International College of Surgeons

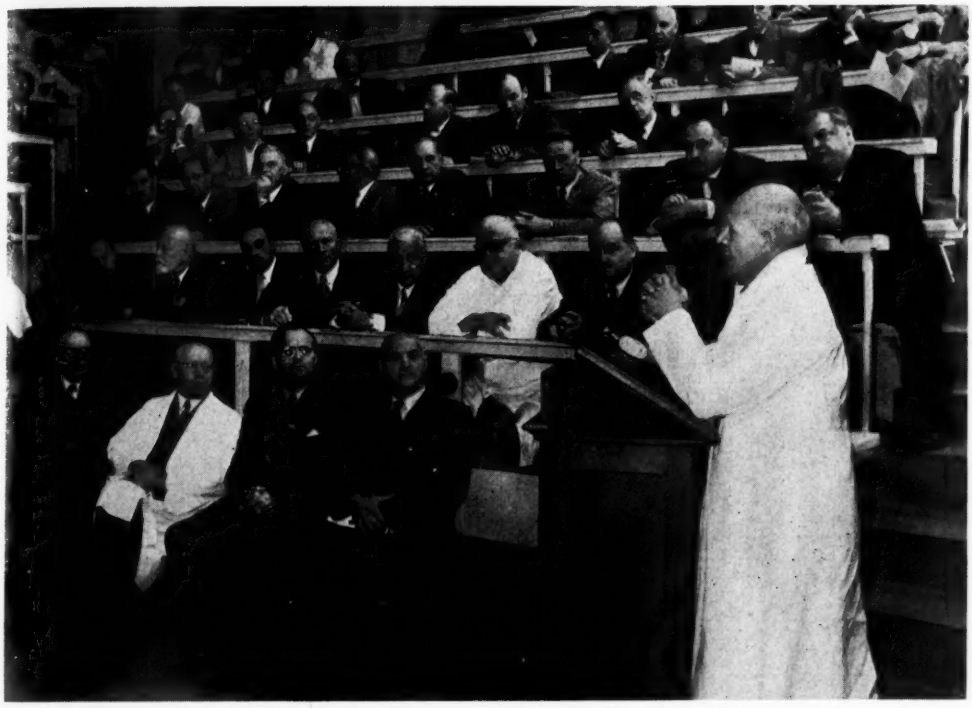
MAY 26-28 INCLUSIVE, 1952

Those who loved Vienna in the days of her insouciant gayety and charm find her equally charming, like the aristocrat she is, despite years of war and the aftermath of war. No hint of her tribulations marred the hospitality and good fellowship extended to the surgeons who attended the meeting of the Austrian Section on May 26 to 28. The guests were warmly welcomed by Prof. Dr. Hans Finsterer, President of the College, and heard a memorable series of scientific presentations, many of which will appear in successive issues of the Journal.

In his duties as presiding officer, Prof. Dr. Finsterer was assisted by Drs. Felix Mandl, L. Schönbauer, R. Oppolzer, T. Antoine and L. Böhler, all of Vienna. The theme of the meeting was carcinoma, its prevention and treatment.

Many surgeons from the United States appeared on the program. Dr. Harry E. Bacon of Philadelphia discussed ligation of the aorta in the surgical treatment of carcinoma of the rectum and sigmoid; Dr. Roland Klemme of St. Louis, malignant tumors of the brain; Dr. Arnold S. Jackson of Madison, Wisconsin, carcinoma of the thyroid gland; Dr. E. L. Compere of Chicago, giant cell tumors of osseous origin; Dr. O. S. Lowsley of New York, renal malignant tumors; Dr. M. L. Brodny of Boston, neoplasms of the renal pelvis; Dr. S. L. Perzik of Beverly Hills, California, malignant tumors of the neck. Dr. F. Teller of Brooklyn spoke on thyroid carcinoma. Dr. S. Perez of California, presented an angiographic study of malignant disease, and Dr. R. H. Abrahamson of Stamford, Connecticut, a review of 707

Austrian Minister of Education addressing the opening session of the meeting in Vienna.



Prof. Dr. H. Chiari at opening session of the Reunion of the Austrian Section of the International College of Surgeons in Vienna.

cases of carcinoma.

The majority of the European participants were surgeons of Vienna, although presentations were also made by speakers from Düsseldorf, Naples, Paris, Salzburg, Graz, Linz, Hamburg and other cities. Guests from the United States found much food for thought in the presentations of Prof. Schönbauer on the hereditary biologic aspects of carcinoma; of Prof. Mandl on the surgical management of the disease and the potentiality of cure; of Prof. Chiari on the histologic picture; of Prof. Finsterer on the surgical treatment of gastric malignant disease, and of Dr. Reimer, who discussed the after-treatment of patients operated on by the Finsterer technic.

The Monday afternoon scientific session was opened by Dr. K. Huber, who discussed malignant tumors of the brain. Malignant neoplasms of the spinal cord formed the basis of Dr. H. Kraus' presentation. Dr. R. Ullik spoke on carcinoma of the mandible; Dr. H. Brücke, on the management of plastic surgical procedures; and Drs. V. Orator and E. Aigner, jointly, on the surgical management of carcinoma in the abdominal area.

The second day's first session began with an address on extirpation of the larynx by Dr. O. Novotny. On the same day Dr. A. Lorenz discussed tumors of bone and exhibited illustrative slides presenting diagnostic difficulties. Dr. W. Ehalt of Graz spoke on the roentgen diagnosis of orthopedic conditions; Dr. R. Herbst, also of Graz, on the electrosurgical treatment of carcinoma. Prof. E. Domanig of Salzburg spoke on the prevention of postoperative thrombosis and thromboembolism. Dr. G. Salzer's address

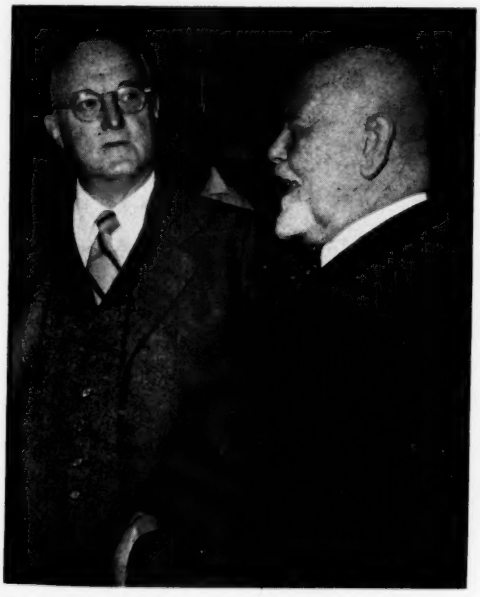
Some members of the Reception Committee at the meeting of the Austrian Section in Vienna. Left to right, Dr. Manuel A. Manzanilla, Mexico; Dr. Max Thorek, Chicago; Dr. Hans Finsterer, Vienna; Dr. Henry W. Meyerding, Rochester, Minnesota, and Dr. H. Chiari, Vienna.

Portrait study of Prof. Dr. H. Chiari, Dean of the University of Vienna, during a discourse.

was concerned with the pathologic and therapeutic aspects of bronchial carcinoma. Dr. A. Lezius of Hamburg discussed resection of the bronchial bifurcation, and Dr. K. Fellinger the differential diagnosis of intrathoracic tumors. Dr. E. Lauda spoke on hepatic and cholecystic tumors, and Drs. F. Spath and H. Kopf, carcinoma of the esophagus and of the stomach, respectively. Dr. R. Ubelhor's title was "Radical Operation for Carcinoma of the Prostate", and his address was illustrated with films. Dr. M. Sorrentino of Naples discussed surgical treatment of carcinoma of the bladder. Dr. R. Herbst recounded the effects of electrosurgery on carcinoma, and Dr. Kopf lectured, with films, on the technic of a procedure employing strumectomy.

On Wednesday May 28, the final day of the meeting, Dr. O. Bsteh of Mistelbach reported on plication in the treatment of Hirschsprung's disease; Dr. Antoine, on endometriosis as a borderline condition that may be subject to malignant change. Prof. H. Knaus presented the results of 600 radical operations performed according to Wertheim and Schauta. Dr. K. Kratochwil of Graz presented a study of the clinical and histologic aspects of mastopathy.

Prof. Schönbauer of Vienna.



Dr. Henry W. Meyerding of Rochester, Minnesota, and Prof. Böhler of Vienna.

Vaginal operation in its technical aspects was presented by Prof. P. Werner. In the afternoon Prof. L. Böhler described the development of traumatic surgery in Austria, with emphasis on the need of adequate hospital facilities. Dr. J. Böhler of Linz delivered a paper on the use of the nailing technic for fractures of the upper part of the thigh. Dr. R. Gottlob

offered an evaluation of the influence of various factors on the prognosis of peripheral obliterative vascular disease, and Dr. R. Singer spoke on arteriosclerotic circulatory disturbances in the extremities. The last three papers presented were those by Dr. I. G. Knoflach on the management of stored blood supplies, by Dr. O. Stritzko on the operative use of stored blood and plasma, and Dr. O. Popp on the technic of arterial injection.

Without exception, the contributions were sound, scholarly, well presented and thoroughly abreast of the times. Dr. Finsterer closed the meeting with an excellent resume of the lectures and discussions that made up the program.

The fraternal and social atmosphere of the meeting was thoroughly delightful. Special events prepared in advance for the members of the Austrian Section and its guests included a reunion in the Kursalon city park, a delightful supper in the Restaurant Linde, and a visit to the Vienna institutions of state. The program of entertainment prearranged for the ladies offered a guided tour to Schönbrunn, with unforgettable views of medieval castles, followed by a drive through the Wienerwald, immortalized by Johann Strauss in his exquisite waltz "Tales of the Vienna Woods." On Tuesday afternoon a cocktail party and style show were given at International House.

Few cities in the world's history have had so enchanting a social and intellectual tradition as Vienna. To most of us the very word suggests music, laughter, romance, and the indomitable spirit of learning for learning's sake. To this is added, in the Austrian Section of the International College of Surgeons, the better and higher motive of learning for humanity's sake; and we may well be grateful to our colleagues in Vienna, not only for their hospitality and the stimulation afforded us by their researches, but by showing us what can be done for humanity by determined researchers and practitioners who must perform their surgical miracles without all the numerous aids that come at our call.

To know of some one here and there whom we accord with, who is living on with us, even in silence—this makes our earthly ball a peopled garden.

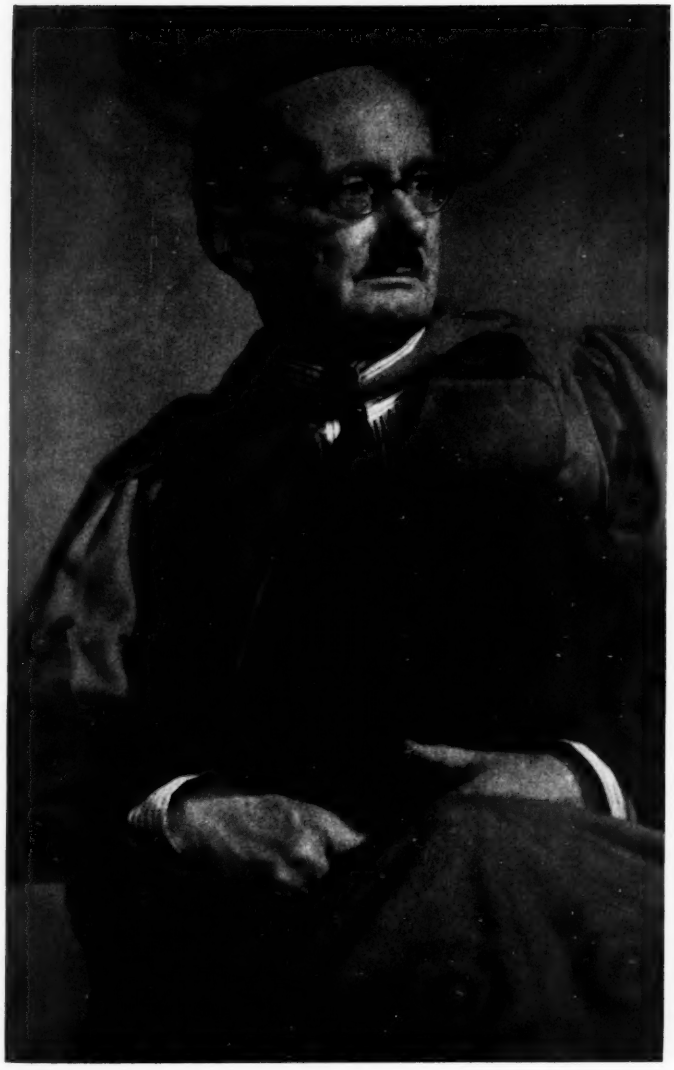
—Goethe

It is a matter of perfect indifference where a thing is originated; the only question is, "Is it true in and for itself?"

—Hegel

Opinion is like a pendulum and obeys the same law. If it goes past the center of gravity on one side, it must go a like distance on the other; and it is only after a certain time that it finds the true point at which it can remain at rest.

—Schopenhauer



The Rt. Hon. Lord Horder, G.C.V.O., M.B., M.D., F.R.C.P. (London), London, England. Lord Horder's address to the recent Congress of the United States and Canadian Sections, International College of Surgeons, will appear in the November issue of the JOURNAL.

Reunion in Amsterdam

Netherlands Section, International College of Surgeons

MAY 29 AND 30, 1952

BY another fortunate coincidence in time, guests and delegates to the Eighth International Congress were privileged to be present at the formal inauguration of the Netherlands Section of the International College of Surgeons, under the Presidency of Dr. George Chapchal, with Dr. Glazenburg as Secretary.

A reception committee welcomed the guests to the city, and an official reception by the Lord Mayor was held on the evening of May 29 in the Municipal Museum. Even before this reception a most delightful day had been spent; at 9 a.m. the visitors left the Amstel Hotel for a tour of the famous flower center, Aalsmeer, followed by luncheon at the Westeinderplas Yachting Club. In the afternoon there was a boat trip through Amsterdam's legendary canals. This was a truly nostalgic two hours for those who in childhood had reveled in stories of Holland, its dykes and its windmills, its rosy, bright-clad children skating to school, its acres of nodding tulips, its immaculate cleanliness and homelike atmosphere. Many had the familiar feeling

The Lord Mayor of Amsterdam speaking at the Municipal Museum during his official reception of the visiting surgeons and their wives.

Dr. Thorek responding to the welcome of the Reception Committee in Amsterdam.

Visit to Aalsmeer flower mart.

Dr. Bax of Arnhem, Netherlands, addressing the visiting surgeons at the banquet given by the Netherlands Section in Amsterdam.

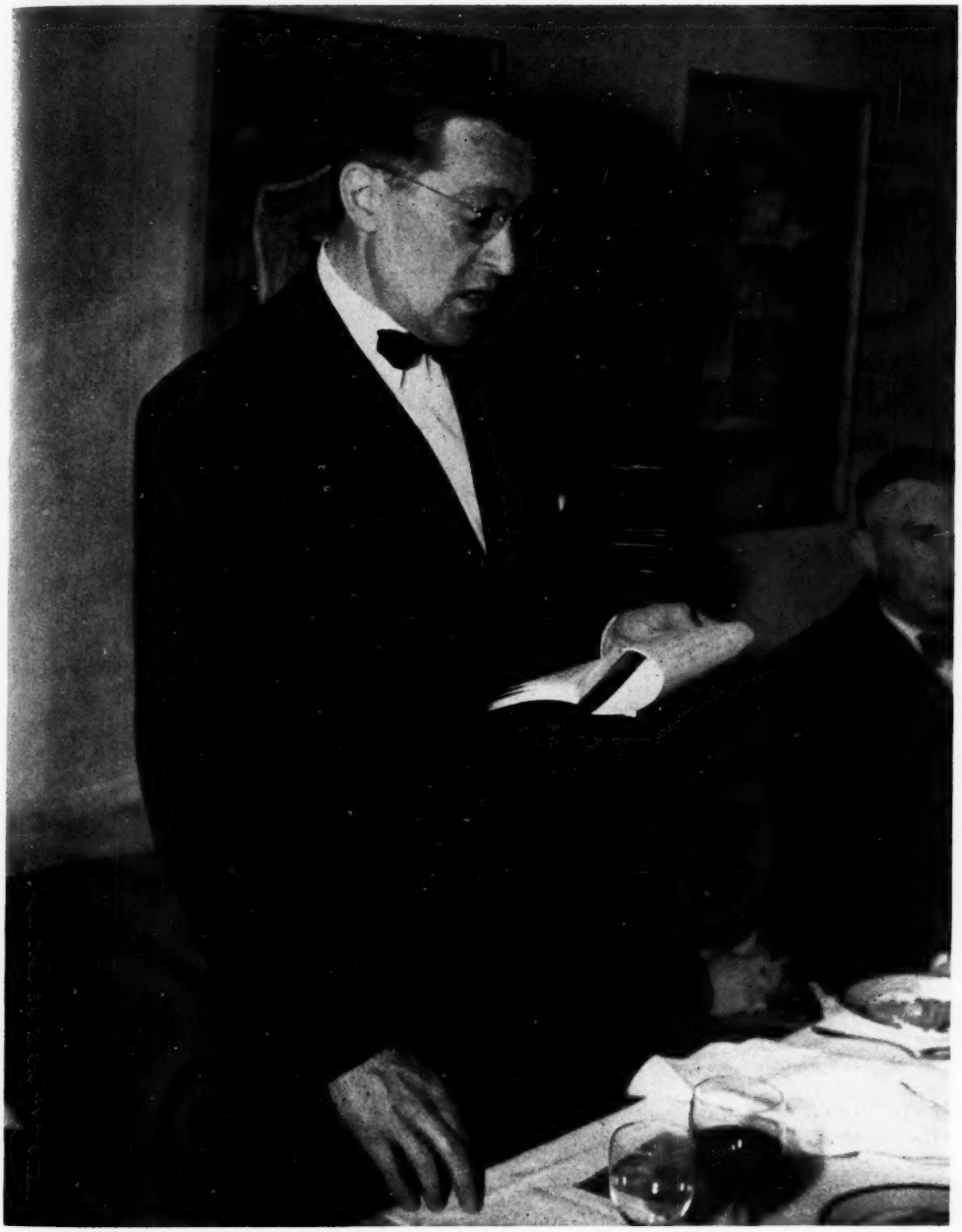
"I have been here before."

On Friday a motor drive to the famous medieval Castle Muiderslet was arranged and gave great pleasure. The party returned to Amsterdam at noon, and each spent the afternoon as best pleased him, many seizing the opportunity, which was afforded on both days, to visit the fine hospitals of the city. At 6 p.m. there was a cocktail party in the International Cultural Center. Here as everywhere, the guests and delegates from America were warmly and hospitably entertained.

The official banquet followed directly. Dr. Chapchal, President of the Netherlands Section, addressed the assemblage, and the Secretary's report was read by Dr. Glazenburg. Dr. Bax of Arnhem spoke to the visiting surgeons. Diplomas were then formally presented to members of the Section.

Honorary Fellowships were awarded to Drs. D. van Cappellen and M.C.A. Klinkenbergh. Dr. van Cappellen is Privatdocent in Urology at the University of Amsterdam and Founder of the Urologic Clinic of that institution. He is a member of the Urological Society of Amsterdam, the French Association of Urologists, the Belgian Association of Urologists, the International Society of Urology, the American Urological Association, and the Association of Genitourinary Surgeons. Dr. Klinkenburgh is Chief Surgeon at St. Anthonius Hospital of Utrecht. His specialties are thoracic and cardiac surgery. He is a surgeon in active practice as well as a teacher and a noted author.

A highly interesting feature of the banquet was the presentation to the College by Dr. Bernhard Neumann, delegate from Israel, of a valuable and unique



Dr. George Chapchal, President of the Netherlands Section, Addressing delegates and guests of the Congress.

ancient document, which we reproduce for our readers on the opposite page: a physicians' oath antedating that of Hippocrates. The oath was found at the end of a medical work by Asaph, physician of Eretz-Israel in the sixth century A.D. and was administered by the Jewish teachers of medicine in awarding diplomas to medical students. An analysis of this oath was published by Dr. Sussman Muntner of Jerusalem in *Harophe Haivri*, New York, 1947, and also in the introduction to Asaph's book, which will appear in the near future.

The ceremonies in Amsterdam brought the European experience to a peculiarly fitting and satisfying close. It was once again apparent, as it has been so often

Dr. Glazenburg, Secretary of the Netherlands Section, presenting his report.

AND THIS is the oath administered by Asaph, the son of Berachyahu, and by Jochanan, the son of Zabda, to their disciples; and they adjured them in these words: Take heed that ye kill not any man with the sap of a root; and ye shall not dispense a potion to a woman with child by adultery to cause her to miscarry; and ye shall not lust after beautiful women to commit adultery with them; and ye shall not disclose secrets confided unto you; and ye shall take no bribes to cause injury and to kill; and ye shall not harden your hearts against the poor and the needy, but heal them; and ye shall not call good evil or evil good; and ye shall not walk in the way of sorcerers to cast spells, to enchant and to bewitch with intent to separate a man from the wife of his bosom or a woman from the husband of her youth ◠ And ye shall not covet wealth or bribes to abet depraved sexual commerce. ◠ And ye shall not make use of any manner of idol-worship to heal thereby, nor trust in the healing powers of any form of their worship. But rather must ye abhor and detest and hate all their worshippers and those that trust in them and cause others to trust in them, for all of them are but vanity and of no avail, for they are naught; and they are demons. Their own carcasses they cannot save; how, then shall they save the living? ◠ And now, put your trust in the Lord your God, the God of truth, the living God, for He doth kill and make alive, smite and heal. He doth teach man understanding and also to do good. He smiteth in righteousness and justice and healeth in mercy and lovingkindness. No crafty device can be concealed from Him, for naught is hidden from His sight ◠ He causeth healing plants to grow and doth implant in the hearts of sages skill to heal by His manifold mercies and to declare marvels to the multitude, that all that live may know that He made them, and that beside Him there is none to save. For the peoples trust in their idols to succour them from their afflictions, but they will not save them in their distress, for their hope and their trust are in the dead. Therefore it is fitting that ye keep apart from them and hold aloof from all the abominations of their idols and cleave unto the name of the Lord God of all flesh. And every living creature is in His hand to kill and to make alive; and there is none to deliver from His hand. ◠ Be ye mindful of Him at all times and seek Him in truth and uprightness and rectitude that ye may prosper in all that ye do; then He will cause you to prosper and ye shall be praised by all men. And the peoples will leave their gods and their idols and will yearn to serve the Lord even as ye do, for they will perceive that they have put their trust in a thing of naught and that their labour is in vain; (otherwise) when they cry unto the Lord, He will not save them. ◠ As for you, be strong and let not your hands slacken, for there is a reward for your labours. God is with you when ye are with Him. If ye will keep His covenant and walk in His statutes to cleave unto them, ye shall be as saints in the sight of all men, and they shall say: "Happy is the people that is in such a case; happy is that people whose God is the Lord." ◠ And their disciples answered them and said: All that ye have instructed us and commanded us, that will we do, for it is a commandment of the Torah, and it behooves us to perform it with all our heart and all our soul and all our might: to do and to obey and to turn neither to the right hand nor to the left. And they blessed them in the name of the Highest God, the Lord of Heaven and earth. ◠ And they admonished them yet again and said unto them: Behold, the Lord God and His saints and His Torah be witness unto you that ye shall fear Him, turning not aside from His commandments, but walking uprightly in His statutes. Incline not to covetousness and aid not the evildoer to shed innocent blood. Neither shall ye mix poisons for a man or a woman to slay his friend therewith; nor shall ye reveal which roots be poisonous or give them into the hand of any man, or be persuaded to do evil. Ye shall not cause the shedding of blood by any manner of medical treatment. Take heed that ye do not cause a malady to any man; and ye shall not cause any man injury by hastening to cut through flesh and blood with an iron instrument or by branding, but shall first observe twice and thrice and only then shall ye give your counsel. ◠ Let not a spirit of haughtiness cause you to lift up your eyes and your hearts in pride. Wreak not the vengeance of hatred on a sick man; and alter not your prescriptions for them that do hate the Lord our God, but keep his ordinances and commandments and walk in all His ways that ye may find favour in His sight. Be ye pure and faithful and upright.

Thus did Asaph and Jochanan instruct and adjure their disciples.

Dr. Neumann, delegate from Israel, addressing the meeting of the Netherlands Section and presenting the Hebraic Medical Oath of the physician Asaph, antedating the Oath of Hippocrates by some hundred years.

before, that the seeds of international cooperation sown long ago in the founding of the College are yielding a great and constant increase of the harvest hoped for —an active, continuous and friendly interchange not only of scientific but of friendly officies among nations of widely differing cultures and traditions. The success of the International College in this field should prove to those in other fields that the "better world" of fellowship and understanding, for it is no exaggeration to say that, so far as the spirit of international cooperation is concerned, the College is a visible microcosm of that better world at its best.

In the country of the blind, the one-eyed man is king.

—*Erasmus*

Everything in nature is a cause from which flows some effect.

—*Spinoza*

Editorials

Theirs is the Harvest

It is with immense but certainly justifiable pride that we present in this issue the most impressive tribute possible to the officers of the International College, from our International President, Prof. Dr. Hans Finsterer to the end of the list—a documental and pictorial record of their achievements as embodied in the Eighth International Congress at Madrid and in the four auxiliary meetings at Barcelona, Bordeaux, Vienna and Amsterdam. Without their constant, loyal and largely unpublicized devotion, the International College of Surgeons could not have reached its present strength and value. Yet every one of them performs his official duties *in addition* to a heavy and responsible schedule of his own. They are rewarded for this tremendous effort only by the knowledge that in serving the College they are serving mankind. That they find this reward sufficient and more than sufficient is an eloquent testimony to the high quality of their devotion.

We believe that this issue will be read and preserved not only by those who were able to attend the Congress and will therefore cherish it as a memento of so happy and rewarding an occasion but by every member of the International College of Surgeons. We believe that in the hospitals and medical schools to which the Journal goes every month it will be received with pleasure—the pleasure felt by everyone connected in any way with medicine and surgery when honest effort is crowned with high achievement.

We have therefore spared no effort, in preparing this Congress issue, to make it worthy of the men who made it possible. It is, in a very real sense, dedicated to them . . . to the officers of the International College all over the world, in gratitude, admiration and inexpressible respect.

—M. T.

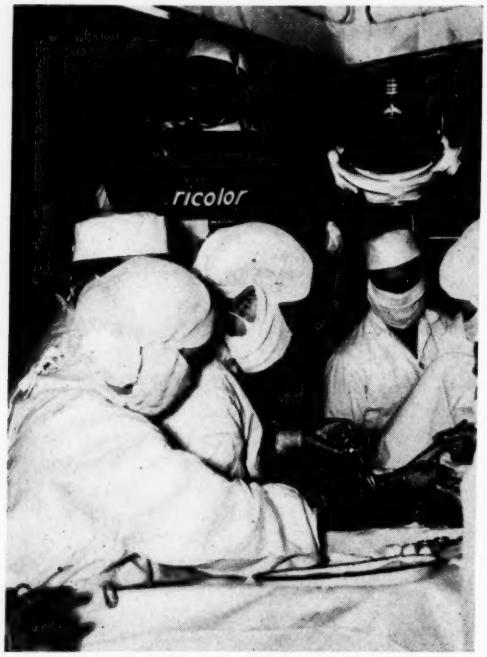
A Marriage of Sciences

Those present at the Madrid meeting of the International College of Surgeons in May truly witnessed a fine example of the marriage of two sciences in other words, an excellent demonstration of a new medium—Vericolor television—applied to medical instruction.

This new advance must be considered a revolutionary development, a milestone in surgical education and instruction.

The host and sponsor of the demonstration was Charles Pfizer & Co., Inc., of Brooklyn, New York, antibiotic manufacturers, in whose laboratories terramycin was discovered. The complex equipment necessary to such a project is somewhat overtechnical to describe, but considering the cumulative achievement—the remarkable ease of communication, both visual and auditory, between audience, surgeon and/or lecturer—it is worth while to describe the procedure briefly.

The Vericolor camera is fixed on a tripod mounting and, for each demonstration, was set at the most advantageous horizontal position, with due regard to an unobstructed view of the activity of the surgeon, the operative area, and the necessity of eliminating obstruction to the surgeon's complete freedom of action. A corrected lighting source is used, and lenses, operated remotely at a control monitor,



Demonstration of Vericolor television at the Madrid Congress.

are focused and rotated to cover closely the entire operative field. Simply, then, the image is carried electronically through the remote control section to the television receivers. In addition, intercommunication is established between the surgeon and the audience by means of a small microphone and headset in the mask and cap of the surgeon and a loudspeaker arrangement at the television receiver.

At the Madrid meeting six television receivers were in operation, accommodating approximately 300 persons at a sitting. Most impressive to this audience was the color fidelity, which was accurate to the point of providing natural color gradations of anatomic details, including nerves, arteries and tendons impossible 4.0 visualize properly with ordinary television, and reproducing for the viewer the subtle nuances as actually seen by the operating surgeon. On May 21 a hysterectomy performed by Prof. Garcia Orcoyen was televised, as was a resection of the nervi erigenti by Prof. Alfonso de la Peña, in a patient with generalized pelvic tuberculosis. On May 23 Prof. de la Fuente performed a subtotal gastrectomy and a resection of the rectum for carcinoma. On the next day, May 24, Prof. Martin Lagos demonstrated an arthroplasty of the hip, and Dr. Bordiu performed a pneumonectomy.

The demonstrations were inaugurated with a special demonstration for officials of the Congress and invited guests on May 20, at which time speeches were made by Prof. de la Fuente Chaos, Secretary General of the Congress, Dr. de la Iglesia, urologist from Madrid, Dr. M. Bordiu, thoracic surgeon, and Dr. Rascon, representing the Spanish medical press. The program was concluded with Spanish songs and music offered by the medical students' choir. The enthusiasm and interest aroused in the attending members well indicates the success of the demontration and the value inherent in the marriage of these two sciences.

In our schools and universities we are accustomed to the constant repetition of surgical procedures and technics for the sake of several small groups of students. We are also accustomed to demonstrations in larger auditoriums, which benefit those attendent in decreasing progression as they are seated upward and back from the operating table. We have also seen technics illustrated by slides, films and models when adequate results can be obtained only in life.

We have tolerated and proceeded well, within these unavoidable limits, but we are now given a greatly extended outlook. Through color television, large numbers of students and interested observers can be treated at one time to a close-up view of the skills and technics of our finest surgeons and greatest teachers—an experience for which there is no substitute. We can visualize the response to an announcement of an unusual operation taking place on television receivers in hospitals and medical centers. Further, the intercommunication system provides the much de-

sired opportunity for complete and quiet question, answer and explanation.

True, the science of electronics has never been backward about aiding medicine and surgery, and its contributions have been well and truly valued. Seldom before, however, has such rapidity of assistance been demonstrated. Color television was first announced about two and a half years ago, and in May of this year we have seen a total audience of thousands of persons at one time or another, over a period of five days, sit in a room in Madrid, Spain, and view a demonstration of unparalleled achievement in medical communication and instruction. The arrival of color films brought with it a measurable advance in direct study of Surgery, but it has also its various inconveniences, the principal one being the extraordinary potency of light which brings about the subsequent development of heat. The camera itself is another inconvenience; because of its voluminous size, it is necessary to place it next to the operating table on a platform that requires considerable space. This is obviated by the new technic, which will be welcomed by practitioners and teachers of surgery throughout the world with the same enthusiasm that greeted it at Madrid. —M. T.

The International College of Surgeons

announces the organization of a

Woman's Auxiliary

to the United States and Canadian Sections, to aid in Section activities and in extending the aims and ideals of the International College. For full information, please address the Secretary, 1516 Lake Shore Drive, Chicago 10, Illinois.

Section News

International College of Surgeons

Brazilian Section: A vote of thanks and admiration from the College is due to Donna Maria Carmelita Leme de Oliviera Garcez, President of the Sao Paulo State Commission of the Brazilian Legion of Assistance and wife of Prof. Dr. Lucas Nogueira Garcez, Governor of the State of Sao Paulo. Donna Maria Carmelita, a lady as generous and public-spirited as she is beautiful, has obtained from the Legion a grant of $400,000 (20,000 American dollars) to finance the publication and preservation of the Proceedings of the First National Congress of the Brazilian Section in Sao Paulo.

The first volume, which deals with minimum standards in hospital installations and organization in Brazil, was presented to the Chamber of Deputies by a member of that body, Dr. Camilo Aschcar, who expressed immense gratitude to D. Maria Carmelita and the Legion for the perpetuation of material so important to the annals of surgical science.

D. Maria Carmelita Leme de Oliveira Garcez.

From the incipiency of College activities in Brazil, D. Maria Carmelita has devoted time, thought, energy and personal resources to all possible ways and means of strengthening and extending the influence of the College for the benefit of her countrymen. Thoroughly modern and practical in her social opinions, entirely feminine in the grace and charm of her personality, she is an outstanding example of the best type of modern woman, who knows how to concern herself with the affairs of the world and at the same time remain unchanged as a friend and a woman. The Journal and the College take great pleasure in congratulating Donna Maria Carmelita on this latest signal achievement and extend the felicitations of the College to the Brazilian section which is indeed well aware of its good fortune in winning her devotion.

PROF. DR. CARLOS GAMA

Assembly of Brazilian Section: The Second National Assembly of the Brazilian Section of the International College of Surgeons and the First Pan-American Surgical Congress was held in Curitiba, Parana, Brazil, beginning on September 29, 1952, under the auspieces of the Government of the State of Parana.

The themes of the Congress were:

1. Biliary Surgery
3. Thoracotomy—Indications and Contra-indications.
2. Death by Anesthesia

Surgical Lectures Sponsored by Brazilian Section: A course of lectures on "Surgery of Varicose Veins" was recently conducted by Professor Dr. Mario Degni, F.I.C.S., under the auspices of the Regional of Santos, with the approval of the Brazilian Section. In November a week's course of lectures on

"Surgery of Biliary Ducts" will be conducted at Sao Jose do Rio Preto by Dr. Plinio Bove under the auspices of the Brazilian Section at the request of the Regional of Alta Arraquarense.

New College Publication in Argentina: The Revista del Capitulo Argentino, Colegio Internacional de Cirujanos (Review of the Argentine Section, International College of Surgeons), a brand-new organizational quarterly publication directed by Prof. Dr. Jorge A. Taiana and edited by Sr. Carlos A. Irianna, has appeared as a contribution to the surgical literature. Prof. Taiana reports that the activities of the Argentine Section become every day more intense, effective and productive, expressing his conviction that the new journal will fill a decided need in Argentina. The entire Argentine surgical literature is reviewed. A cut of the *Revista* is presented on page 62. We congratulate Prof. Taiana and the Argentine Section on the enterprise and the quality of its production.

Argentine-Brazilian Fellowships: The Argentine Section of the International College of Surgeons is granting Fellowships for study in Brazil, in close cooperation with the similar program of Fellowships granted by the Brazilian Section to Argentine students. After a study of the qualifications and antecedents of the candidates, the following were awarded Fellowships:

Dr. Mario Carlos Medus, in thoracic surgery, at the Institute of Thoracic Surgery, chair of Prof. Dr. Jorge A. Taiana, September 15 to November 15

Dr. Juan Pablo Caccia, in thoracic surgery, Institute of Thoracic Surgery, chair of Prof. Jorge A. Taiana, October to December

Dr. José Lagrutta, in abdominal surgery, Rawson Polyclinic, chair of Prof. Dr. Ricardo Finochietto, September 1 to November 1

Dr. Vicente Luis Bearzi, in gynecologic surgery, Policlínico Remos Mejía, service of Prof. Dr. Normando Arenas, September 1 to November 1

Dr. Carlos M. E. Quaranta, in histopathology, Clinical Hospital, chair of Prof. Dr. Juan Carlos Ahumada, October to December

Dr. Américo Nunziata, in orthopedic surgery, Santa Casa de Sao Paulo, Brazil, chair of Prof. Dr. Domingos Define

Dr. Jorge Luis Curutchet, in abdominal surgery, Clinical Hospital, Brazil, service of Prof. Dr. Eurico Branco Ribiero

In addition, the Brazilian section has reported to the Argentine Section on three recipients of Fellowships who are already working in Buenos Aires. These are

Dr. Antonio Radovir dos Santos, in thoracic surgery, Institute of Thoracic Surgery, chair of Prof. Dr. Jorge A. Taiana, August 28 to September 28

Dr. Ary Rodriguez, in abdominal surgery, Experimental Cancer Institute, chair of Prof. Dr. Abel N. Canónico, September and October

Nelson Carrera Perez, in traumatic and plastic surgery, Policlínico Ramos Mejía, chair of Prof. Dr. Carlos M. Casco, October and November

This fine cooperation between the neighboring Sections of Argentina and Brazil reveals a spirit on which the College may congratulate itself. The possibilities of such an arrangement can hardly be exaggerated, and the purpose behind it is a perfect exemplification of the established ideal of the International College of Surgeons as a teaching Institution.

PROF. DR. JORGE A. TAIANA

Austrian Section Cooperates in Postgraduate Course Resumption: The American Medical Society of Vienna, formerly the American Medical Association of Vienna, announces the resumption of postgraduate courses in English offered by the Vienna Academy of Medicine (medical faculty of the University of Vienna) in cooperation with the International College of Surgeons. Dr. M. Arthur Kline, Executive Secretary of the Society, calls to the attention of all the 11,800 American postgraduates who attended A.M.A. courses in Vienna, the fact that their old "Alma Mater," although slightly changed in name, is again in existence and again offering highly personalized courses of the highest type.

Israel Section, International College of Surgeons: In an article on "Surgery in Israel" in the January-June, 1952, issue of the Journal of the Medical Association of Israel, the following statement is made: "A

Section of the International College of Surgeons was recently established in Israel, and meetings will be held periodically; this is a valuable development, because it will facilitate contact with surgeons from other countries." The author of this article, Dr. P. Natan, also states: "There exists in Israel a surgical society as a branch of the general medical organization. This society, which was founded immediately after the formation of the State, has until now had two meetings. It can be stated with satisfaction that the standard of the papers and discussions has been high. There is every hope that the Surgical Society will be an important factor in the progress of surgery in Israel."

UNITED STATES SECTION

KARL A. MEYER, M.D., F.A.C.S. F.I.C.S.,
Secretary

Tennesseans Enjoy Assembly: Dr. John Dougherty, Regent for the State of Tennessee, reports: "At the recent meeting in Chicago, a number of Tennesseans attended with participation on the program, particularly that of the urological section. Those who attended the meeting in Chicago felt that it was one of the best organized scientific conventions that they have attended."

Herbert Acuff Memorial Fund: Dr. Dougherty also reports that Dr. E. Park Nicely of Knoxville, has been active throughout Tennessee and in the entire United States Chapter in the management and advancement of the Herbert Acuff Memorial Fund. Dr. Dougherty adds: "Dr. Nicely has taken time from his busy practice to give effort and momentum to the continuation and advancement of the Fund; everyone appreciates his efforts and hopes for the good results that we are all sure he will obtain."

Alabama Surgical Division Holds Meeting: The Fifth Annual Assembly of the Alabama Surgical Division, United States Section, of the International College of Surgeons, held its fifth Annual Assembly at the Whitley Hotel in Montgomery, Albama, on October 9. The Assembly was held in cooperation with the Alabama Academy of General Practice and the Montgomery County Medical Society. Dr. John A. Martin of Montgomery is President of the Alabama Chapter.

An excellent clinical program was arranged, an outline of which follows:

MORNING SESSION

Presiding:
J. O. Morgan, M. D. Gadsden
Paul S. Mertins, Jr., M.D., Montgomery

Secretary:
George S. Peters, M.D., Montgomery

Cervical Pain
Jackson Bostwick, M.D., Neurosurgeon, Montgomery

Surgical Aspects of Congenital Heart Disease
William Scott, M.D., Professor of Surgery, Vanderbilt University, Nashville

Genito-urinary Disease as a Cause of Non-urological Complaints
George C. Poore, M.D., Urologist, Euclid Clinic Foundation, Cleveland

Intermission

Presiding:
H. E. Simon, M.D., Birmingham
C. D. Johnson, M.D., Montgomery

Secretary:
L. R. Gayden, M.D., Montgomery

Partial Gastrectomy in Peptic Ulcer with Report of 500 Cases
Lon W. Grove, M.D., Assistant Professor of Surgery, Emory University, Atlanta

Breast Cancer Diagnosis and Treatment
Louis P. River, M.D., Associate Clinical Professor of Surgery, Loyola University, Chicago

Urological Complications and Gynecological Surgery
Ed Williams, M.D., Department of Gynecology, Vanderbilt University, Nashville

AFTERNOON SESSION

Presiding:
Paul W. Shannon, M.D., Birmingham
J. P. Gillespie, Jr., M.D., Gadsden

Secretary:
Elias N. Kaiser, M.D., Montgomery

Vascular and Neurological Phenomena in Orthopedics
Don Miller, M.D., Orthopedic Surgeon, Chicago

Orthopedic Problems
A. Scott Hamilton, M.D., Orthopedic Surgeon, Monroe Louisiana
Pelvic Pain
Harry H. Jenkins, M.D., Gynecologist and Obstetrician, Knoxville
Intermission
Presiding:
J. U. Reaves, M.D., Mobile
W. B. Virgin, M.D., Montgomery
Secretary:
S. A. Zieman, M.D., Mobile
Cancer of the Cervix
Harold E. Simon, M.D., Surgeon, Birmingham
Byrn Williamson, M.D., Surgeon, Birmingham

BANQUET

Presiding:
Gilbert Douglas, M.D., Chairman, Board of Regents, United States Section, International College of Surgeons, Birmingham
Remarks on the International College of Surgeons
John A. Martin, M.D., President, Alabama Surgical Division
Introduction
J. O. Morgan, M.D., Regent, Alabama Surgical Division, Gadsden
Speaker
Honorable Albert Rains, Congressman, Fifth Congressional District of Alabama, Gadsden

NINTH INTERNATIONAL CONGRESS, 1954

Notice to All Members of the International College of Surgeons

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of Sao Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direction of Prof. Dr. Carlos Gama, Vice-President of the International Congress and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the City of Sao Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of Sao Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Sao Paulo
Secretaria, Praca Ramos de Azevedo, 7.° Andar, Sala 710, Sao Paulo, Brazil.

IX° Congresso
Colégio Internacional de Cirurgiões

Aviso Aos Membros do Colégio

A Comissão organizadora do IX Congresso do C.I.C. a realizar-se em São Paulo, Brasil, em 1954, por meio dêste faz saber a todos os interessados que é inteiramente inconveniente antecipar a data de 26 de abril-2 de maio, 1954, marcada para a sua realização, para a de fevereiro ou março de 1954, conforme solicitação de vários elementos do grupo norte-americano.

O IX Congresso do C.I.C. está sendo planejado para ser uma das mais briliantes comemorações culturais do grupo dos festejos do IV Centenário de São Paulo, devendo atrair à capital do Estado de São Paulo cerca de 2.500 Congressistas.

O Governo de São Paulo, empenhado em que os festejos do IV Centenário constituam oportunidade para que nossos ilustres visitantes fiquem confortavelmente instalados, e possam ter a mais agradável permanencia em nossa capital, está estimulando a construção de 3 novos hotéis, que serão inaugurados justamente em abril de 1954.

Assim, pois, em fevereiro ou março, 1954, a situaçao para hospedagem em São Paulo para um grande grupo de Congressistas, é identica à atual, isto é, difícil e deficiente, sendo necessário espalhar os Congressistas em muitos pequenos hotéis, e sendo maior o grupo, alguns necessitando instalar-se em hotéis que não possuem condições mínimas de conforto.

Por outro lado, o Governo de São Paulo está providenciando para o ano de 1954 grandes empreendimentos, que tornarão o turismo ao nosso Estado muito mais agradável; assim, a segunda pista da aoto-estrada São Paulo-Santos, que abreviará a viagem, tornando o passeio mais seguro e agradável.

Assim também, a instalação de uma Feira Internacional de A mostras, no Parque Ibirapuera, que permitirá aos visitantes apreciar o desenvolvimento da indústria de todas as partes do mundo.

Assim também o governo de São Paulo está fazendo apressar as obras da cidade Universitária, em Butantã, e outras obras grandiosas, nas quais vários

grande s salões de conferencias serão feitos, para permitir lugares adequados à reuniões de grandes Assembléas.

Finalmente, a Comissão organizadora do IX Congresso do Colégio Internacional de Cirurgiões, desejando dar aos visitante uma oportunidade excepcional para verem floridas numerosas espécies brasileiras, entrou en entendimentos com sociedades de colecionadores de orquídeas, como o Círculo Paulista de Orquidófilos, para que eles desde já preparem suas plantas para florirem justamente em Abril, 1954.

A Comissão organizadora do IX Congresso, lastimando não poder atender ao pedido do simático grupo de congressistas norte-americanos, pelos motivos acima expostos, espera ter o prazer de recebê-los em São Paulo, cordialmente, em abril de 1954, desejando desde já que tenham os mesmos no Brasil uma estadia agradável, ao mesmo tempo que realizando um Congresso social e científico digno das credenciais do C.I.C.

Os temas oficiais escolhidos foram os seguintes:

1) Experiencias com a Socialização da Medicina nos diversos países.

2) Novas aquisições da Radiologia com contrastes nas várias especialidades cirurgicas): a) Neuro-Cirurgia b) Sistema cardio-vascular c) Endocrinologia d) Aparelho respiratório e) Aparelho Urinário f) Tubo digestivo g) Ortopedia h) Ginecologia.

3) Experiencia com o uso de antibioticos em todos os ramos da cirurgia: a) Neuro-Cirurgia b) Sistema cardio-vascular c) Aparelho respiratório d) Aparelho Urinário e) Tubo digestivo f) Ortopedia g) Ginecologia.

Ulteriormente, depois de esolhidos os relatores para os temas oficiais, e eleitos os convidados de honra, novos avisos serão feitos por intermédio do Journal, a todos os interessados.

Todos os que desejarem participar do IX Congresso Internacional em São Paulo, em abril de 1954, queiram com antecedencia escrever para o.

Prof. Dr. Carlos Gama.
Praça Ramos Azevedo, 209-70, andar
São Paulo, Brasil.

Scientific Exhibits and Motion Pictures
shown at

EIGHTH INTERNATIONAL CONGRESS OF INTERNATIONAL COLLEGE OF SURGEONS

INSTITUTO NACIONAL DE MEDICINA
Y SEGURIDAD DEL TRABAJO
Facultad de Medicina, Pabellón n.° 8
Ciudad Universitaria
MADRID, SPAIN

SCIENTIFIC EXHIBITS

Newer Treatment in Clinical Surgery Employing Iodine Preparations.
Dr. Bernard J. Ficarra, Brooklyn, New York.

Bilateral Thyrotomy for Carcinoma of the Larynx.
Dr. Joseph I. Kemler, Baltimore, Maryland.

Simplified Thyroidectomy.
Dr. J. E. Bellas, Peoria, Illinois.

Celiac Artery Aneurysm.
Dr. E. A. Garland, Evansville, Indiana.

Rehabilitation of the Amputee.
Dr. Henry H. Kessler, Newark 2, New Jersey.

Pelvic Support (Maintenance of Good, Repair of Poor Positions of Pelvic Organs).
Dr. George B. Callahan, St. Therese's Hospital and Victory Memorial Hospital, Waukegan, Illinois.

Surgical Applications of Automatic Serial Angiography.

Historical Development of the Seriograph.
Dr. J. M. Sanchez-Perez, Los Angeles 27, California.

Congenital Anomalies of the Ano-Rectum.
Dr. Saul Schapiro, Brooklyn, New York.

Partial Colpocleisis (Latzko's Operation) for Vesico-Vaginal Fistula.
Dr. H. C. Falk, New York 24, New York.

Tocographic Studies upon The Parturient Human Uterus by an Original Method.
Dr. Samuel M. Dodek, George Washington University, Washington 6, D. C.

Bone Engine
Dr. Carl C. Yount, Pittsburgh 13, Pa.

UNITED STATES AIR FORCE MEDICAL SERVICE
UNITED STATES OF AMERICA
AERO MEDICAL EVACUATION OF PATIENTS
Washington, D. C.
DEMONSTRATOR: WILFORD F. HALL
Brigadier General, USAF (MC)

MOTION PICTURES

Mobilization of the Human Body.
Dr. Harvey E. Billig, Jr., Los Angeles 4, California.

Rehabilitation of a Pianist.
Dr. Henry H. Kessler, Newark 2, New Jersey.

Early Ambulation.
Dr. D. J. Leithauser, Detroit 24, Michigan.

Medullary "K" Nailing of the Humerus to the Spine of the Scapula for Shoulder Arthrodesis.
Dr. Garrett Pipkin, Kansas City 6, Missouri.

A New Beginning.
Dr. Howard A. Rusk, New York University, Belleview Medical Center, New York 14.

Single Hare Lip Repair.
Dr. Claire L. Straith, Detroit 23, Michigan.

Right Hemi-Thyroidectomy for Cystic Adenoma.
Dr. Bernard J. Ficarra, Brooklyn 15, N. Y.

Abdominoperineal Proctosigmoidectomy (in Spanish).
Dr. Harry E. Bacon, Philadelphia 3, Pa.

Treatment of the Fractured Spine Without the Use of Plaster Casts.
Dr. Eugene L. Jewett, Orlando, Florida.

Pelvic Support.
Dr. George B. Callahan, Waukegan, Illinois.

Resection of the Polyp by Sigmoidotomy.
Dr. Garnet W. Ault, Washington 6, D. C.

Prolapse of the Uterus Complicating Labor.
Dr. Samuel M. Dodek, Washington 6, D. C.

Stricture of the common bile duct.
Repair with End-to-End Anastomosis Over a Long T-tube.
Dr. Richard B. Cattell, Boston, Mass.
(Courtesy, Davis & Geck, Inc., Brooklyn 1, N. Y.)

Superficial Keratectomy.
Corneal Transplantation.
Dr. Richard A. Perritt, Chicago 3, Illinois.

Cancer of the Larynx.
Dr. Joseph I. Kemler, Baltimore, Maryland.

An Improved Technic for the Operative Treatment of Common Anorectal Lesions.
Dr. Louis E. Moon—Dr. J. B. Christensen, Omaha 2, Nebraska.
(Courtesy, The Wm. S. Merrell Company, Cincinnati, Ohio.)

Esophageal Diverticulum.
Two-stage Operation for Removal of a Large Sac.
Demonstration of Complications.
Dr. Frank H. Lahey, Boston, Mass.
(Courtesy of Davis & Geck, Inc., Brooklyn, N. Y.)

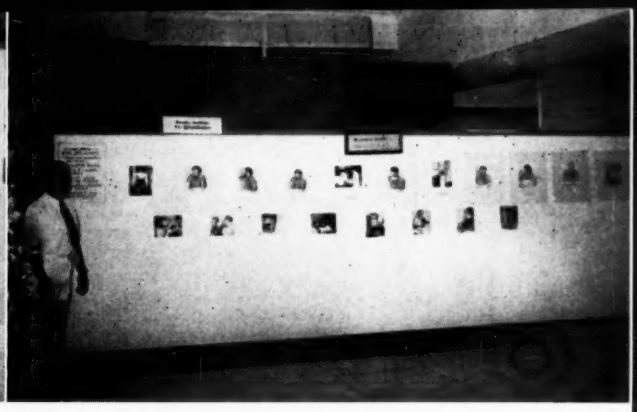
Rehabilitation of a Paraplegic Amputee.
Rehabilitation of a Blinded Bilateral Arm Amputee.
Dr. Henry H. Kessler, Newark 2, New Jersey.

Removal of Massive Osteoma of Skull with Tantalum Cranioplasty.
Subdural Hematoma in Infants.
Dr. Ralph M. Stuck, Denver 2, Colorado.

Krukenberg Stump in a Child 2½ years old.
Dr. Carl C. Yount, Pittsburgh, Pa.

Acute Subdeltoid Bursitis: Treatment with Repeated Stellate Ganglion Blocks.
Dr. Everett J. Gordon, Washington 6, D. C.

Pelvic Support (Maintenance of Good, Repair of Poor Positions of Pelvic Organs).
Dr. George B. Callahan, Waukegan, Illinois.



Rehabilitation of the Amputee.
Dr. Henry H. Kessler, Newark 2, N. J.

Scientific and Technical Exhibits Eighth International College of Surgeons Congress Madrid, Spain May 18-24, 1952.

View of the Technical Exhibits.

Exhibitors

Dr. J. E. Bellas
Dr. George B. Callahan
Dr. Samuel M. Dodek
Dr. H. C. Falk
Dr. Bernard J. Ficarra
Dr. E. A. Garland
Dr. Joseph J. Kemler
Dr. Henry H. Kessler
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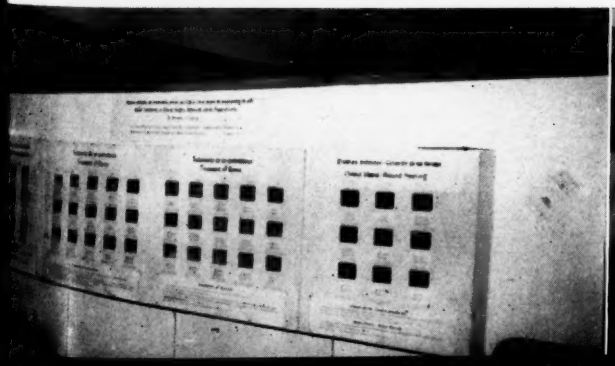
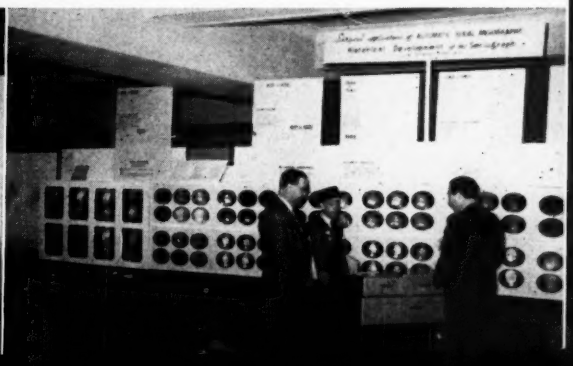
Newer Treatment in Clinical Surgery Employing Iodine Preparations.
Dr. Bernard J. Ficarra, Brooklyn, New York.



Surgical Applications of Automatic Serial Angiography.
Historical Development of the Seriograph.
Dr. J. M. Sanchez-Perez, Los Angeles 27, Calif.



REVISTA

DEL

CAPITULO ARGENTINO

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COLEGIO INTERNACIONAL DE CIRUJANOS

Volumen 1 | **Enero a Marzo 1952** | **Número 1**

CASEROS 2153 — T. E. 27 - 6462 — BUENOS AIRES

New publication of the Spanish Section, International College of Surgeons.

New Books

Doctors Differ: Five Studies in Contrast. John Elliotson, Hugh Owen Thomas, James Mackenzie, William Macewen, and R. W. Philip. By Harley Williams. Springfield, Ill.: Charles C Thomas, Publisher, 1952. Pp. 239.

Readers both medical and nonmedical will welcome this reissue under an American imprint of a book that first appeared in 1946. Lucid in style, rich in narrative, perceptive in scholarship, it deserves and will doubtless win a continued lease on life. The author is John H. Harley Williams, M.D., British biographical essayist and novelist.

A glance at the title might suggest that this is a catalogue of medical disagreements, but such is not the main emphasis. Contrasts are here indeed, differences in personality and outlook, even bitter controversy. But these are inevitable differences in the course of nineteenth and twentieth century advances, and one comes away with the sense of a variety of personalities contributing to overall progress.

There are also many more characters than the five on the title page, and the reader is made to feel that the British scene, although it occupies the spotlight, is only one scene on a much broader stage.

Thus the chapter on the mesmerist Elliotson and his tilt with his contemporaries and the *Lancet* also introduces the reader to the followers of the French Mesmer, to the Scot James Braid who gave us the term "hypnotism," and to the development of mental studies. The chapter on Hugh Owen Thomas is really an appreciation of three pioneers of British orthopedics—Thomas, his nephew Robert Jones, and Agnes Hunt, the founder of British orthopedic nursing. Next, in sharp contrast, are the characters of James Mackenzie and William Osler, the Scotch physician versus the cosmolite of two continents, both contributors to understanding of heart disease. Then a section on two brain surgeons, William Macewen and Victor Horsley, with highlights on the neurologist John Hughlings Jackson and the phrenologist Franz Gall. Finally, there are full-length portraits of two generals in the conquest of tuberculosis, Robert Philip and Edward Livingstone Trudeau, with flashbacks of Laënnec, Koch and others.

The result is a definitely popular set of studies, stimulating for the student and layman, generous in insights and curious information. We peer in at Osler in his friend's library, writing the *Principles and Practice* amid a forest of open books; we follow Mackenzie's decision as he renounces the lucrative role of consultant and returns to small town general practice. And at the end, we are left with the Stracheyan figure of the pompous but lovable Philip, founder of tuberculosis clinics, and his statesman's vision: "the conquest of disease through the attainment of health."

Doctors Differ is thus a pleasant book to read, to own, and to give.

M. T.

The Knee and Related Structures: Injuries—Deformities — Diseases — Disabilities. By Philip Lewin. Philadelphia: Lea & Febiger, 1952. Pp. 914, with 333 illustrations.

This book follows a well-known system of presentation, the text being divided into 44 chapters and an appendix. The bibliography covers 27 pages and is alone well worth the price of the book. The author has used his characteristic style of writing, calling attention to every conceivable condition of the human knee joint about which any surgeon might like to learn. The book will be of great value to surgeons who are called upon to treat any condition of the knee. A copy should be in every medical library.

The first ten chapters deal with the anatomic and physiologic aspects of the knee from the physical, clinical and roentgenologic points of view. Starting with Chapter 14, the author rightfully begins with nonoperative procedures and later discusses the basic preoperative requirements. Each structure of the knee joint is dealt with separately, but the interrelationships are not neglected. The author outlines the chief pathologic features in each given condition. It would be difficult to find any phase of treatment for conditions of the knee that is not mentioned in one or more of the forty-four chapters.

The illustrations are clear and concise. The author is to be congratulated upon the excellent content of this text.

HORACE E. TURNER, M.D.

The Fight Against Tuberculosis; An Autobiography. By Francis Marion Pottenger. New York: Henry Schuman, Inc., 1952. Pp. 276.

It is a pleasure to welcome Dr. Pottenger to the company of physician-autobiographers. As an author, of course, he is already well known to his confreres, who are thoroughly acquainted with the long list of books, articles and lectures that have established his authority in the field of tuberculosis.

As an autobiographer, he has now performed an additional service for all who open these pages. There will be many—doctors, administrators, lawmakers, teachers, students, laymen interested in the tuberculosis movement. There are important messages for each of these groups.

The author has purposely taken the disease as title and himself as subtitle. This indicates an important purpose of the book as he has conceived it. His excellent résumé of the history and treatment of tuberculosis, and his story of the genesis and development of his own diagnostic methods and the founding of the Pottenger Sanatorium, written in clear layman's language, reach a high level. Of course, the profession has access to these facts in technical form, but the author's own informal impressions of his work and his reactions to it are keenly interesting.

Perhaps most attractive to members of the International College of Surgeons will be Dr. Pottenger's account of his many trips abroad for self-improvement and his high regard for international conferences as media of medical advancement. His first-hand descriptions of the great figures of nineteenth century medicine are also of great biographic value.

The other major contribution, since this is after all an autobiography, is Dr. Pottenger's own story, with his remarks on time and its changes and the meaning of all this for us today. It is a story of the growing up of the son of a prosperous but hard-working Ohio farmer, attending a small church college and then spending two years in medical school. Marriage was followed by a European trip; then Dr. Pottenger began practice in Cincinnati in the 1890's. Those were the days when cure of tuberculosis was a rarity, and when the disease laid its hand on the young doctor's wife, the couple migrated to California—in vain. After the loss of his wife, Dr. Pottenzer determined to practice in California, became the first tuberculosis specialist on the west coast, and opened the sanatorium that bears his name.

Dr. Pottenger's deep sense of man's achievement is thus the fruit of his own life's work and accomplishment. He speaks with joy and humility of the advances he has seen in his own lifetime. His own words carry all the more authority in the light of his great admiration for men and times that have passed. He knows what we have gained and also what we have lost—or are in danger of losing—in living, education and practice. He describes the clinical acumen of his masters, a skill too easily slighted in favor of the marvelous laboratory methods available today. An educator in touch with present reforms, he also points out the advantages of the old preceptor system, the student's former freedom from uncertainty in choosing a medical career, and the high order of teaching by the masters of his youth.

These and other reflections make Dr. Pottenger's autobiography one to ponder and return to.

A bibliography of the author's publications concludes the volume.

M. T.

Surgical Forum: Proceedings of the Forum Sessions, Thirty-Sixth Clinical Congress of the American College of Surgeons. Pp. 665, with 260 illustrations.

This book is born of the need for young men to present their research on surgical problems to an audience of surgeons. Every phase of surgery is covered, from the cervical esophagus to the large bowel and pancreas, from the liver and bile ducts through cardiac and vascular surgery, and wounds, electrolytes, sanguine derivatives, malignant disease and anesthesia. Some sections are too didactic for the general surgeon. Several of the sections are treading in pioneer territory, this is true especially of the work done in experimental cardiac surgery by the Harold Brun Institute group in San Francisco. The papers are well edited, and the surgical challenges involved today will become the feats of tomorrow with the strides that anesthesia is making. This book is recommended for the busy general surgeon who wishes to treat conditions which he feels insecure in handling today. The difficult and experimental phases would interest the resident in surgery to an extent that would justify annual publication of these Proceedings.

JEROME J. MOSES, M. D.

Abstracts from Current Literature

The Management of Patients Whose Hearing Loss Is Due to Otosclerosis. Kos, C. M., J. Iowa State Med. Soc. 42: 153, 1952.

An extremely interesting fenestration operative technic is described in an article well worth reading and filing away for future reference. The operation is beautifully illustrated.

The author gives the following criteria to determine suitability of the patient for operation:

1. Tympanic membranes are normal.
2. Hearing is serviceable in using a telephone; seems to be appreciably improved in a noisy environment, and is adequately clear with a hearing aid.
3. Roentgenograms of the temporal bones show normal pneumatization.
4. Hearing loss occurs in the late 'teens or early twenties, or even later in life, and is not directly related to systemic or local infection.
5. There is a family history of hearing loss.
6. The hearing loss at some time during its course is described as progressive, whether or not it is related to pregnancy.

The degree of success to be expected can be predicted with 96 per cent accuracy by the audiometric criteria for selection used and the operative technic employed. The operation is a safe procedure; no one has ever died from it.

A two-stage operation is discussed, and it appears that this will offer even better end results than have been obtained in the past.

CLAUDE M. WARREN, JR., M.D.

Ascorbic Acid in Surgical Patients, with Particular Reference to their Blood Buffy Layer. Grandon, J. H.; Mikal, S., and Landau, B. S.: Surg., Gynec. & Obst. 95: 274, 1952.

In the seriously ill patient, the ascorbic acid content of tissues, buffy coat, whole blood and plasma appears to be in a state of constant flux. The more or less predictable relation between blood and tissue ascorbic acid observed in experiments with acute deprivation in otherwise normal subjects are not observable in the sick patient.

From studies of dietary histories and from blood and tissue levels, it became apparent in this series that anterior rectus fascia of ascorbic acid levels below 1.5 mg. per hundred indicated significant deficiency according to the Roe-Kuether method.

When the ascorbic acid content of both tissue and buffy layer is low, clinical scurvy may become apparent. When both values are very low, healing may be poor.

EDMUND LISSACK, M.D.

Pilonidal Sinus of the Axilla. Aird, I.: Brit. M. J. 1:902, 1952.

Pilonidal suppurations have been reported as occurring in the sacrococcygeal region, the perineum, the barber's hand, the sole of the foot, and the umbilicus. To these, the author, working in the Department of Surgery, Postgraduate Medical School of London and Hammersmith Hospital, adds a sixth site, the axilla.

The case is reported of a 34-year-old, dark-haired, abnormally hirsute man with a small sinus in the right axilla which he said had been discharging intermittently for six months. The previous history included (1) a pleural effusion investigated elsewhere and considered nontuberculous, (2) an episode of supraspinatous tendinitis, and (3) a pilonidal sinus of the sacrococcygeal region which had been operated on previously.

Local excision of the draining area of the axilla was attempted on two occasions without success. The third attempt to excise the skin of the floor of the axilla was successful. The defect was repaired with an advancement flap.

The pathologic report was typical of pilonidal sinus. It seems clear that this patient had a pilonidal sinus of the axilla, although it is not possible to say whether the axillary suppuration was due originally to buried hair or whether the pilonidal effect was consequent upon some downgrowth of, or downward traction upon, hair-bearing axillary skin in the granulation tissue and scarring of an axillary suppuration due to some other cause. The possibility of a pilonidal effect in the axilla may perhaps usefully be borne in mind when patients present themselves with intractable superficial inflammations in that region.

HENRY J. ROSEVEAR, M.D.

In Memoriam

FRANK A. LORENZO

M.D., F.A.C.S., F.I.C.S.

Dr. Frank A. Lorenzo, industrial and traumatic surgeon of Punxsutawney, Pennsylvania, died on May 20, 1952, at the age of 73. He received his M.D. degree in 1904 from the College of Physicians and Surgeons of Columbia University. Later he did extensive postgraduate work in surgery, pathology, fractures and diagnosis. He was a member of the surgical staff of Adrian Hospital Association in Punxsutawney from 1906 to the time of his death.

LOUIS STRAHLMANN

M.D., F.I.C.S.

Dr. Louis Strahlmann, who was Chief of Orthopedic Service at San Diego County General Hospital and Mercy Hospital in San Diego, died in May 1952 at the age of 60.

Dr. Strahlmann received a B.S. degree in 1914 and an M.D. degree in 1917 from Harvard University. He served his internship at Boston City Hospital and did postgraduate work at Carney Hospital in Boston. He specialized in traumatic and orthopedic surgery. He became a Fellow of the International College of Surgeons in 1947.

LEO CARROLL LARKIN

M.D., F.I.C.S.

Dr. Leo Carroll Larkin and his wife were killed in an automobile accident on August 23, leaving four children. Dr. Larkin, whose specialty was proctology, lived and practiced in Oak Park, Illinois. He was 46 years of age and had been an associate member of the International College of Surgeons since 1947, earning his advancement to qualified Fellowship this year.

Dr. Larkin received his M.D. degree from the University of Illinois College of Medicine in 1933; served internships at Manteno State Hospital at Manteno, Illinois, and at Cook County Hospital in Chicago. He served surgical residencies at Cook County Hospital and at the U. S. Naval Hospital at Great Lakes, Illinois. He was a diplomate of the American Board of Proctology and an Associate Fellow of the American Proctological Society. He was a proctologist on the senior surgical staff of Oak Park Hospital from 1936 to the time of his death; a member of the staff of West Suburban Hospital since 1936; consultant at St. Anne's and Westlake hospitals; clinical proctologist at Cook County Hospital since 1936; head of proctology, assistant chief of surgery, and president of the executive staff of Loretto Hospital; clinical instructor at Stritch School of Medicine of Loyola University since 1950; and clinical proctologist on the staff of the Fantus Clinic, Cook County Hospital, since 1936.

DAVID IDE

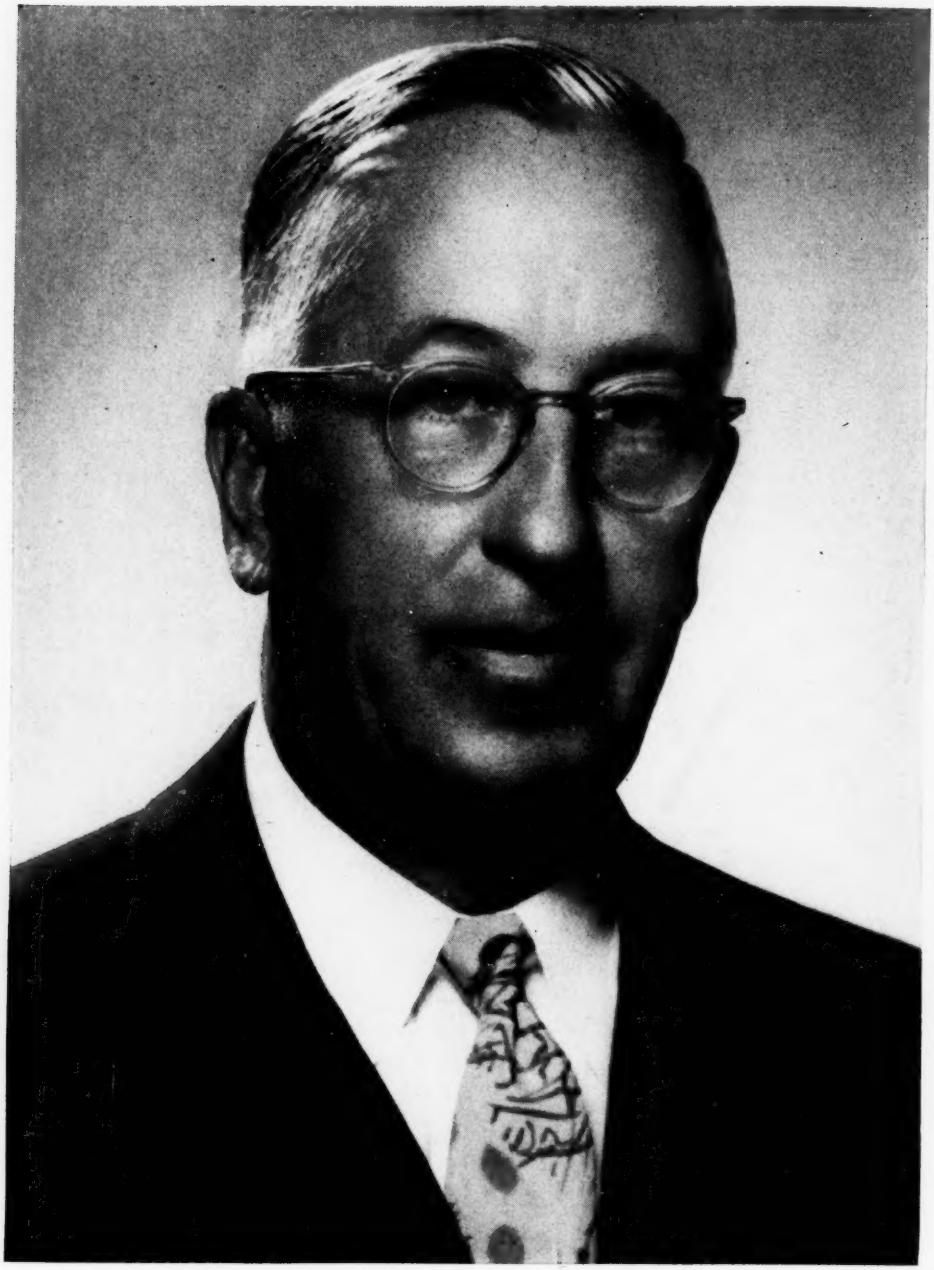
M.D., F.A.C.S., F.I.C.S.

At the age of 55, Dr. David Ide, otolaryngologist of New York City, died in his office on July 17, 1952.

Dr. Ide received his M.D. degree from New York University in 1920. He did postgraduate work in his specialty at the University of Vienna, Temple University, and Postgraduate Hospital of Columbia University. At the time of his death he was attending surgeon in rhinolaryngology at City Hospital, director of otolaryngology at Lebanon Hospital, and attending otorhinolaryngologist at Jewish Memorial Hospital. He was appointed a consulting police surgeon in 1945. He specialized particularly in peroral endoscopy.

Dr. Ide was a diplomate of the American Board of Otolaryngology, and a Fellow of the American Academy of Ophthalmology, the American College of Surgeons, and the International College of Surgeons.

Dr. William R. Lovelace, F.I.C.S., D.A.B.S.
Albuquerque, New Mexico
President, United States Section, International College of Surgeons



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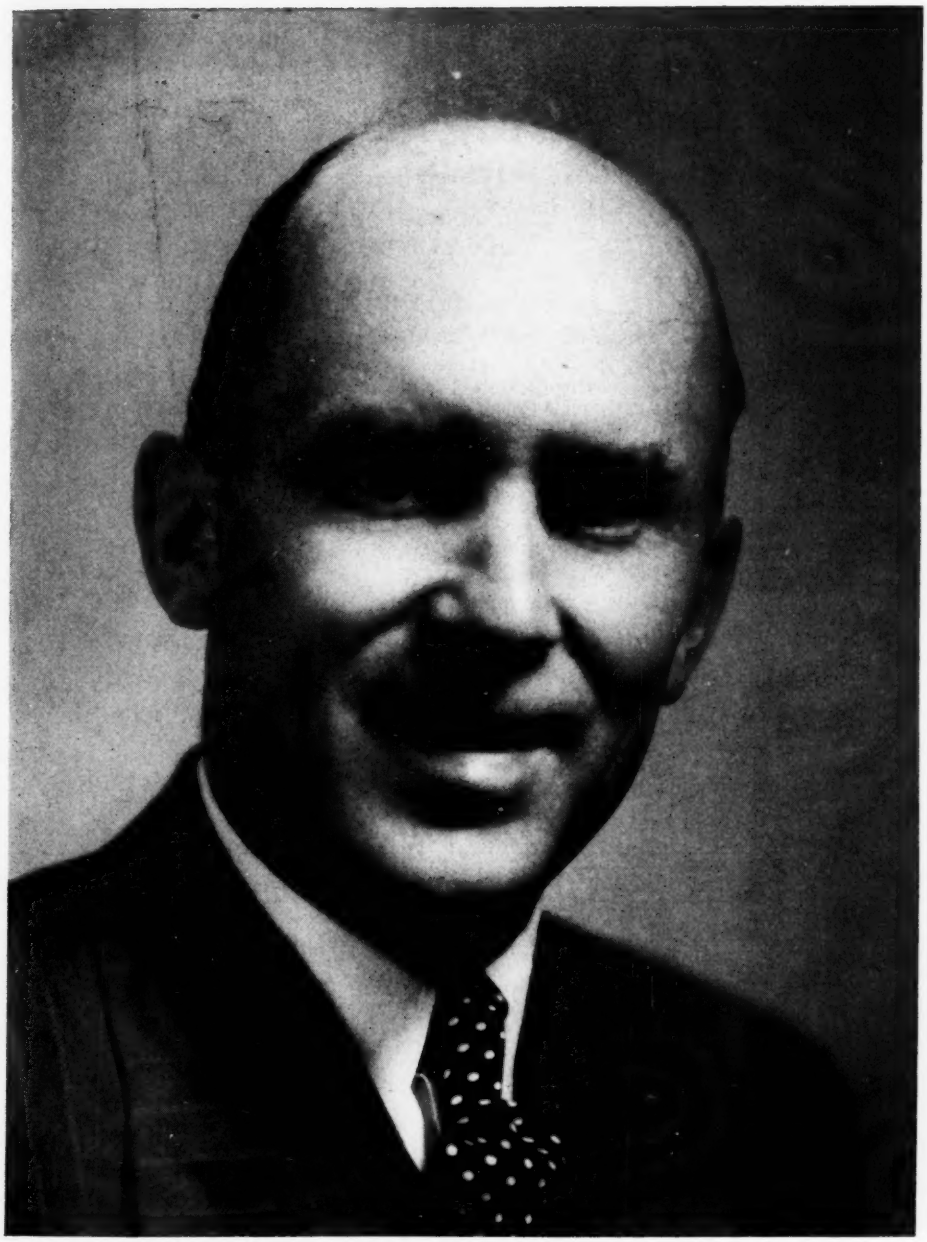

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